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ABSTRACT

Issues and approaches in computer-assisted counseling are presented in this thesis. Reasons are considered for the ineffectiveness of school guidance counselors in helping students make college selections, and a reconceptualization of counseling as a technology of helping is suggested. The uses of computers in counseling are examined along with resulting improvements and effects on guidance programs. Reasons for schools' reluctance to use computer-assisted guidance information systems are considered, including counselor familiarity and orientation, threat to counselor job security and control over work, computer accuracy and impersonality, threat to privacy, and cost. A history of computer-assisted guidance information systems is presented, with descriptions and analyses of current and future systems. CHOOSE, a new computer-assisted guidance information system for college selection is described. The future of school guidance is considered and resulting implications for counselor education and research are noted. A bibliography is followed by an appendix of CHOOSE user manuals and source code listings. (Author)

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A REVIEW OF ISSUES IN COMPUTER-ASSISTED COUNSELING AND A NEW APPROACH TO ITS APPLICATIONS IN COLLEGE SELECTION

BY

KENNETH A. COLBURN
B.S., Massachusetts Institute of Technology, 1974

A THESIS

Submitted to the University of New Hampshire
in Partial Fulfillment of
the Requirements for the Degree of

Master of Education
in
Counseling and Personnel Services

December, 1980

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DEDICATION

In appreciation of their guidance and instruction in so many skills and sensitivities, this thesis is dedicated to my parents.

ACKNOWLEDGEMENTS

Grateful acknowledgement is made to those individuals who helped bring this work to fruition: Dick Antonak for his demands for excellence and technical support, David Hebert for his encouragement and direction, and Priscilla Woodman for her many efforts in coordinating people and details over a period of years. Special thanks are due to Dwight Webb, whose instruction, dedication, and friendship was a significant factor in this work; and to my wife Gretchen, for her boundless support and patience.

PREFACE

According to the Department of Education's policy statement regarding the thesis option for the Master of Education degree, theses at this level generally consist of collecting and analyzing data about an issue and reporting the results. Occasionally, a thesis comprises a review of the literature about a given subject. More rarely, a theoretical discussion is carried out, advancing arguments and supporting positions (U.N.H. Dept. of Education, Note 1). This unconventional work, however, is an effort to develop interactive computer software to assist students in New Hampshire secondary schools in the process of selecting a college. As such, it contains elements of each of the above types of theses.

Since college selection lies well within the domain of vocational development, discussion of relevant theoretical issues within that domain is necessary. In particular, the process elements of choice and chance, decision-making, and information sufficiency require consideration. In addition, since the school counselor is usually intimately involved with the college selection process, issues such as the role of the counselor relative to information, optimal uses of counselor time, and the suitability of computers for guidance information all require attention before actual computer programming begins.

Also important prior to programming is gaining a perspective of past and present uses of computers in counseling. A review of the relevant literature is necessary in order to develop and clarify goals, to suggest methods, and to avoid pitfalls in the development and implementation of guidance software. In short, a historical review is required to minimize re-inventing the wheel.

Research is also essential to the development of guidance software. In particular, the ability of the target area to use such software must be known before development begins. Otherwise, the resulting product might not be able to be used, or be too simple for meaningful use. Such research, to identify computer capability in New Hampshire secondary schools, has apparently never been done (Prevost, Note 2).

Perhaps the most unusual characteristic of this thesis effort is that it results in a usable product. Few theses, especially in the area of education or human behavior, result in an applicable product, although more computer programs are now being written as theses. Most theses contribute importantly to our awareness and knowledge, but have implications rather than applications as their primary use.

Given the difficulties of doing a thesis involving so many different components, it might be insightful to explain the motivation behind this project. Having been trained in mathematics, self-taught in computer programming, and most recently instructed in counseling, I see a thesis of this type as an opportunity to consolidate and demonstrate my synthesis of these varied skills. I believe this combination of skills to be as rare and as valuable as it is varied, and a multi-faceted thesis provides the chance to develop and illustrate integration of these skills.

Secondly, as a preparation for possible future study, a thesis of this sort seems particularly well-suited. Considering theoretical, review, research, and application aspects here provides experience in each area, and a broader foundation in general.

Lastly, my primary objective in this work is to make a direct personal contribution toward enhancing counseling in New Hampshire secondary schools. My personal standard for that contribution is that it be directed toward the students themselves: those who want, need, and deserve any help we can give them in this important area of personal decision-making.

Kenneth A. Colburn
December 1, 1980

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.......................... v

PREFACE................................... vi

ABSTRACT.................................. xii

I. INTRODUCTION............................ 1

II. PROBLEMS IN VOCATIONAL DEVELOPMENT AND EDUCATIONAL PLANNING................ 5

Chance, Choice, and Counseling in Vocational Development........... 6

Components of College Attendance Decisions.............................. 7

Decision-Making as a Process........... 8

The Nature and Use of Information in College Selection................ 13

Problems in College Selection.......... 15

Indictment of the Present Situation... 30

The Future Outlook for High School Guidance.............................. 32

Counseling as a Technology of Helping............................. 37

III. COMPUTER ASSISTANCE IN GUIDANCE AND COUNSELING......................... 42

Information Processing Capabilities of Computers.......................... 43

Improvements to Guidance Through Computer Use......................... 45

Effects of Computer Applications on Guidance Programs.................. 46

Obstacles to the Acceptance of Computer-Assisted Guidance.......... 66

An Historical Perspective on Computer-Assisted Guidance.......... 85

Analysis of the Present Status of Computer-Assisted Guidance.......... 102

Summary and Future Outlook............ 111

IV. A COMPUTER PROGRAM TO ASSIST IN THE COLLEGE SELECTION PROCESS.............. 115

Project Rationale....................... 116

Project Objectives...................... 120

Survey of Educational Computer Capability in New Hampshire......... 123

Factors Important in College Choice... 126

The CHOOSE College Selection Package............................ 129

V. CONCLUSIONS, IMPLICATIONS, AND EXPECTATIONS...................... 133

The Future of School Guidance.......... 133

Implications for Counselor Education.. 138

Implications for Research.............. 141

Conclusion............................. 145

REFERENCES................................. 149

APPENDIX................................... 165

ABSTRACT

A REVIEW OF ISSUES IN COMPUTER-ASSISTED COUNSELING AND A NEW APPROACH TO ITS APPLICATIONS IN COLLEGE SELECTION

by

KENNETH A. COLBURN

University of New Hampshire, December, 1980

College attendance and choice of college are two of the most important decisions a person makes while young. Since career development is comprised of chance and choice elements, best use must be made of choice opportunities. A brief decision-making model is presented for use in career counseling. Information is crucial to wise decision-making, but exponential increases in quantity and complexity make it difficult to process and use. Research indicates that school guidance counselors provide little effective help to students making college choices and sometimes even impede their decision-making. Reasons for this are considered. A reconceptualization of counseling as a technology of helping is suggested.

Computer-assisted guidance information systems can handle most information giving functions, freeing counselors from the burden of gathering, updating, remembering, and dispensing it. Capabilities of computers in counseling are examined along with resulting improvements and effects on guidance programs. Little use of such systems now exists in schools and reasons why are considered including counselor familiarity and prior orientation, threat to counselor job security and control over work, computer accuracy and impersonality, threat to privacy, and cost. A history of computer-assisted guidance information systems is presented, systems are described and categorized, present status is analyzed, and future prospects are noted. CHOOSE, a new computer-assisted guidance information system dedicated to college selection is developed in which local counselors have intimate involvement and control by constructing the college data file. A description of CHOOSE follows specification of its objectives, a survey of educational computer capability in New Hampshire, and an analysis of factors important in college choice.

The future of school guidance is considered and resulting implications for counselor education and research are noted. The conclusion suggests that school guidance as practiced today, at least relative to students' college attendance decisions, may be nearing obsolesence; and steps are recommended to avoid this. An extensive bibliography of computer-assisted counseling follows, with CHOOSE user

manuals and source code listings included in an appendix.

CHAPTER I

INTRODUCTION

> A major objective of the student guidance counseling centers in high schools . . . is to provide individualized aid to each student to help reduce the uncertainty of his [or her] educational and vocational plans. Frequently, this objective is not fully met because of the information handling problems. Two such problems are: (a) the fallibility of both counselor and student in memorizing, associating, and selectively recalling educational and vocational facts; and (b) the inability of the counselor and the student to devote sufficient time, patience, and energy to performing the enormous number of clerical steps involved in relating educational and occupational facts to pertinent information about the student. Computer-based information systems may be able to reduce these deficiencies considerably. (Minor, Myers, & Super, 1969, p. 564)

At the end of a student's high school career, the young graduate faces some of life's most crucial choices, yet he or she is often woefully unprepared, uninformed, and uncounseled in doing so (Borow, 1972; Jones, 1972; Walton & Mathis, 1967). By definition of his or her youth, the student is also inexperienced and unpracticed in such major decision-making (Hammond, 1965). In addition, during a time of exponentially increasing amounts of information and in dissemination capability (Tondow, Note 3), information handling problems often discourage or even prevent wise decision-making (Minor et al., 1969). Further, it is clear from the literature, if not from one's own personal experience, that the student is generally getting little help from his or her high school guidance counselor in dealing with either of these problems (Grossman, 1966; Hammond, 1965; Jones, 1972). The counselor himself also faces many obstacles to assisting young people in vocational and educational planning, some of which are attributable to him directly; many of which are not.

This thesis defines and illustrates the problems involved in vocational development and planning at the high school level, particularly those surrounding the selection of post-secondary educational training. It is clear that many of these problems are the result of information handling deficiencies, and the use of information technology in counseling is examined from both theoretical and historical perspectives. Problems deriving from guidance counselors themselves are also analyzed from a developmental perspective of the profession, and suggestions for improvement are made.

Finally, a solution is offered to some of these problems by the development of a computer program designed to help students directly in their choice of a college and to involve high school guidance counselors personally in the technology of guidance information dissemination. Rather than a contribution to the state of the art of computer-assisted counseling, this computer program is designed to maximize use; it is distributed free of charge, able to run on small computers, and easily counselor-modifiable in order to suit local needs.

The goal of this project is to bring small scale computer-assisted counseling to more widespread use until state of the art counseling technology becomes feasible for extensive use. Through this approach, it is hoped that more guidance offices will use their existing school computers, and that guidance counselors will gain a greater understanding and acceptance of, as well as participation in, computer-assisted counseling. Implications for the future of high school guidance counseling and counselor education are considered, and some suggestions and predictions are offered.

Because educational development and planning is an important interval in and preparation to the larger domain of career development, this discussion draws freely upon sources in the field of vocational and occupational development and planning (Super, 1978). Super (1967b) testifies to the importance of educational development and planning, rating education over occupation as the primary avenue for the advancement of social status. Because vocational choices generally bear some relationship to both past and future choices and are often made expressly to prepare for future choices, issues in educational development and planning cannot be separated from career preparation and early development (Benson, 1967; Katz, 1967; Super, 1967a). As such, the terms "educational", "occupational", and "vocational" may all be included under the term "career" (Harris, 1972; F. Miller, 1968), and are used herein with some degree of interchangeability as they apply to the point in career development where the student is leaving high school and considering his or her next career step.

CHAPTER II

PROBLEMS IN VOCATIONAL DEVELOPMENT AND EDUCATIONAL PLANNING

Inexperience in decision-making, the increasing amount and complexity of information, and inadequate assistance from school guidance counselors plague the graduating high school student who is attempting to engage in meaningful vocational planning. That the first two of these hinder vocational development is obvious, and the third is substantiated by Trent (1965) and Rosenquist (1969) who argue that many high school guidance counselors know little more than their students about college characteristics and do little in the way of post-graduate follow-up, job placement assistance, or providing vocationaly broadening experiences for their students. It is not difficult to see that these three factors combine to make vocational development and planning one of the most difficult problems facing the young person. Impelletteri (1967a) suggests that the area of vocational education is currently attracting the attention of researchers because the problems there are more acute than in other areas and are exacerbated by the rapidly changing nature of the world of work.

Chance, Choice, and Counseling in Vocational Development

To assist young people in vocational planning, it is vital to offer them a framework within which their vocational development occurs. While the exact nature of such a framework would depend on each counselor's preferred theory of vocational development, I would postulate the following as a logical foundation: The two basic elements of vocational development are chance and choice.

Much of the counseling profession has been reluctant to admit the importance of chance in vocational development, since it is, by definition, beyond one's ability to control, improve, or otherwise change (Osipow, 1973). As a result, the chance element has been euphemized with such terms as opportunity, luck, and good fortune.

Many researchers, however, have recognized the vital, albeit unpredictable, role that chance plays (Carp, 1969; Cooley, 1970; Hart, Rayner, & Christensen, 1971; Colburn, Note 4). Perhaps Osipow (1973) best illustrates the importance of chance, stating that being in the 'right place at the right time' may have more to do with vocational decisions than systematic planning and vocational counseling.

Consideration of chance by itself, however, yields marginal insight as it provides little contribution to the understanding of occupational development and stifles debate of issues crucial to vocational counseling. Recognizing the role that chance plays in vocational development instead increases one's awareness of the need for competence in the choice element. If much of our vocational development is determined by chance events, then we must be prepared to make decisions wisely in those areas left to choice. In short, chance favors the prepared mind.

Since a focal point for most counseling involves planning and decision-making activities using choice as a central part of counseling, preparation to make vocational decisions wisely is a natural entry point for career counseling (Reardon, 1975). Maximum control over our lives derives from optimizing, through preparation and wise decision-making, opportunities where we have a choice, such as college attendance and selection. Walton and Mathis (1967) describe the questions "Shall I go to college?" and "What college should I choose?" as two of the four crucial choices that an individual makes while young in life.

Components of College Attendance Decisions

Planning for college attendance involves two decisions: whether to go to college, and, if affirmative, where to go. While certainly a major decision, the decision to go to college is not a particularly confusing one, since it involves a relatively small number of critical factors. Individual ability, family financial capability, and motivation would seem to be the primary determinants (Walton & Mathis, 1967; Endicott, 1967), and these are fairly easily assessed by the student and his or her parents.

The equally important question of where to go to college is far more confusing (Walton & Mathis, 1967). Rosser (1969) characterizes today's college selection process as confused, tumultuous, and often inefficient, suggesting that students make multiple applications without assurance that they can be considered by the schools to which they apply or that if accepted, they are likely to succeed. Other researchers echo Rosser's complaint, describing the present college selection process as "a time consuming and laborious task" (Creative Concepts, 1970, p. 2), "a tangled jungle" (Benson, 1967, p. 52), and "a harsh trial of patience and endurance for most students" ("Admissions," 1969, p. 55), with choices being "made by accidents of propinquity, pocketbook, and propaganda" (Walton & Mathis, 1967, p. 81). Bard (1969) even suggests that the hardest part of getting into college is not getting in, but picking the right one.

Decision-Making as a Process

To pinpoint the confusion in selecting a college, it is necessary to examine the process of decision-making in general. By understanding the decision-making process as a whole, one can better determine what is required for good decision-making, and thus evaluate present decision-making needs more precisely and meaningfully.

Indicative of the need for more consideration of decision-making as a process is the fact that although a great deal has been written about acquiring, organinzing, and displaying information for vocational planning, there is precious little in the literature on how to use information in career counseling (Reardon, 1975). Indeed, Hilton (1969) complains that most current developmental work in vocational guidance seems to assumes that the student is already a rational decision-maker who knows his values, needs, and interests, can recognize viable occupational options, and evaluate them in a fully rational way. This, of course, is an incredible assumption; a great many adults do not meet this description. Nor is the problem restricted to the professional literature. Super (1969) reports that one criticism frequently made by former vocational counseling clients is that while they learned a great deal about themselves as a result of counseling and testing, they received little or no help in deciding what to do with their talents.

Perhaps the most articulate and sensitive analysis of decision-making as a process is the work of Martin Katz (1966, 1969, 1970). Katz (1969) argues that defining 'wise decisions' in terms of career outcomes is not only difficult; it is presumptuous. His reasons include the time lag between the choice point and the judgement day, the limitations inherent in even high predictive validity, and the fact that even if we could objectively describe a decision as wise, little would be accomplished since we will likely never have to make precisely the same decision again. Perhaps most importantly, Katz notes that defining wisdom in decision-making implies that the definer knows or has such wisdom, a dubious proposition at best. He concludes simply that it is much easier to recognize a wise decision than to make one.

To circumvent this problem, Katz shifts the emphasis from defining "wise decisions" to "making decisions wisely": a change from evaluating content to evaluating process. Gelatt et al. (1973) agree with this distinction, suggesting that the quality of a decision is based on how it is made, not on how it turns out. This shift requires a model for the decision-making process, which Katz offers in three sequential parts: a values system, an information system, and a predictive system (Katz, 1966). Super (1969) includes the predictive system within the "Planning" module of his decision-making model, and adds a discreet "Execution" phase.

Decision-making under such a model might be likened to using a kitchen sieve. The development of one's value system is the "utensil" necessary for filtering, retaining, and carefully examining the material put into it. The information system corresponds to the material being filtered and examined, from which alternatives for culinary preparation are invented and weighed for strength of return (Katz, 1966), thus forming the predictive, or planning, system. The choice between the alternatives, the execution, is based on the strongest return anticipated.

The exploration and examination of students' values and goals should certainly be a major concern of guidance counseling, so that their situation will not resemble that of Alice while conversing with the Cheshire Cat in Wonderland:

> "Would you tell me please, which way I ought to go from here?" [asked Alice].
> "That depends a good deal on where you want to get to," said the Cat.
> "I don't much care where--" said Alice.
> "Then it doesn't matter which way you go," said the Cat. (Carroll, 1966, p. 75)

However, the student's need for sound information and predictive systems seems to be even greater than consideration of his or her values at present. Some values system is inevitably instilled in each student during the course of his or her upbringing and schooling, but he or she may have little or no quality information available for the construction of alternatives at any given juncture. Katz (1966) stresses this point by suggesting that with a sound decision-making model and counselor assistance the student will know what information he or she seeks and what to do with it when he or she gets it--but that he or she cannot, at present, always count on getting it.

The need for information is great because one is rarely constrained to choosing between predetermined alternatives, as on a multiple choice test. On the contrary, one's ability and the raw materials available are often the very measure of making decisions wisely. Gelatt et al. (1972) state that whether one can make decisions that he or she is satisfied with depends on things like proficiency at obtaining information and using it to identify and select alternatives. Katz (1969) elevates the importance of information further, asserting that how a choice comes out, and even how one chooses between alternatives, may be less important than how one constructs alternatives.

While the decision-making model just examined is but one of many developed in the past, all models of decision-making stress the importance of good information (Reardon, 1975). Information plays the single most vital role in the decision-making process (Clarke, Gelatt, & Levine, 1965), and regardless of how sophisticated a person is at decision-making, his or her results will be no better than his or her information (Hammond, 1965). Loughary (Note 5) concludes that in the final analysis, all the individual has to work with is information of a given quantity and quality and his or her interpretations or feelings about the information.

The implications for guidance are clear. Peters and Hansen (1966) state unequivocally that vocational guidance is implemented through the use of appropriate occupational information. Grossman (1966) contends that good guidance practice aa a process of converting information into action and that guidance without data is a quackery. Roberts (1969) characterizes the counselor as a vehicle of client actualization, with useful information as the fuel necessary to propel such a vehicle. Katz's (1963) image is perhaps most appropriate:

> We may envision [an inverted] pyramid of guidance needs, with availability of raw information standing as a prerequisite at the base of the heap and supporting the superstructure. (p. 46)

The Nature and Use of Information in College Selection

Given the essential role that information plays in the decision-making process, a brief examination into what information is, and what characterizies good information, is warranted. Information has been defined by Stein (1971, p. 730) as "knowledge communicated or received" or "intelligence," and Norris, Zeran, and Hatch (1966) have characterized good information as being both valid and useable. The notion of validity implies that information be accurate, unbiased, current, specific yet complete, and locally relevant. Useability requires that information be readily available and accessible, interestingly and appealingly presented, understandable, flexible, and easy to use.

In addition, information cannot be considered in a vacuum. It must be intimately related to one's self image, values, and goals (Goldman, 1967). Information should thus be presented in an emotionally acceptable form (Goldman, 1967; Reardon, 1975; Super, 1970, 1973; Youst, 1969), and should describe psycho-social aspects of alternative options as well as factual details (Menacker, 1975; Reardon, 1975; Watts, 1978). Finally, information for college selection must be of such quantity and content that differences between colleges are readily apparent (Walter & Mathis, 1967; Corcoran, 1977).

At present, the high school student's primary sources of college information are his or her guidance counselor, printed materials, and other resources such as parents, friends, and alumni. Many counselor educators and theorists have placed the responsibility for providing educational information squarely upon the guidance counselor, defining information giving as one of his major roles (Harris, 1972; Menacker, 1975; F. Miller, 1968; Norris et al., 1966; Beiss & Fox, 1968; Stripling, 1967; Loughary, Note 5). Peters and Hansen (1966), for example, regard the dissemination of occupational information as one of the basic services of a guidance program, and Reardon (1975) asserts that the counselor must make sure that all relevant information is considered by the student. The research of

Bentley and Salter (1967) indicates that most students agree; they expect their counselor to provide them with information about various alternatives.

Most theorists also require that the guidance counselor assist the student in putting such information to use, both in the exploration and examination of his or her values, which Katz (1966) calls the first concern of guidance, and in the predictive or planning system as well. Gelatt (1967) summarizes:

> It is the function of guidance to escort the student beyond the data and into a profound and rational consideration of the meaning of the data for him [or her]. (p. 111)

Problems in College Selection

Although there is a college to fit the needs of almost any high school graduate (Endicott, 1967; Stripling, 1967), and despite the fact that one of the guidance counselor's primary roles is to bring the student and an appropriate college together, there is much evidence that the college selection process is at best difficult, and at worst, impossible to conduct properly (Roth, 1976). The majority of problems in the college selection process fall into three categories: (1) Problems relating to or caused by information, (2) Problems relating to or caused by guidance counselors, and (3) Other miscellaneous problems.

Problems relating to or caused by information. If, in order to be good, information requires that all the characteristics named earlier be present, then there is an incredible complexity of ways that information may be considered to be poor. If, for example, information is appropriate and relevant but not current, it is only marginally useful. If information is current, accurate, and locally relevant, but not readily available, then it also serves little purpose.

Tondow (Note 3) has defined this complexity as resulting from an exponentially increasing amount of information coupled with an exponentially increasing dissemination capability. These two factors are not operating alone, although by themselves they each have immense implications for counseling. A third influence is in operation as well: New kinds of information are emerging while the uses to which information is being put in counseling are simultaneously changing (Loughary, Note 5). The changing nature of the world of work, the broadening responsibilities being accepted by education, the declining reliance of colleges on aptitude tests as their primary admission criterion (and their corresponding need for alternative information on applicants), and the desire for more psycho-social and cultural information about educational and occupational opportunities are all examples of this third factor.

This "information explosion" makes giving high school students adequate college counseling an increasingly impossible job (Bard, 1969). Further compounding the problem is the fact that the counselor faces an incredibly large, diverse, and unmanageable clientele of individuals whose information needs increase in extent and complexity as they progress through the educational system (Bard, 1969; Norris et al., 1966). In addition, the readiness of individual members of this clientele for educational information is hardly simultaneous.

Tondow (Note 3) cites further informational problems which hinder the counselor. In order to be effective in obtaining relevant information, some overload must occur because the counselor cannot determine if information is relevant until he or she has it. Thus some of the counselor's time is necessarily wasted examining information that turns out to be irrelevant. Conversely, in working toward the goal of data reduction (summarizing), the counselor must be cautious not to oversimplify the information.

That the information explosion is an overwhelming burden is demonstrated by the fact that counselors spend up to 70% of their time in information-related tasks (Bohn, 1970; Cooley, 1970; Harris, 1972; Tondow & Betts, 1969). In relying upon the counselor to gather, sort, validate, update, and transmit tons of educational and occupational literature covering thousands of colleges and occupations, we are being unrealistic. We are asking counselors to accomplish an impossible task (Impelletteri, 1967b).

Other problems combine to make it difficult for students to obtain good informaton. Printed material, the second major source of educational information, is cumbersome and time-consuming to use, not easily updated, and both difficult and expensive to maintain. The labor and postage costs involved in acquiring and maintaining a complete college catalog library, for example, would be prohibitive for most schools (Sawyer & Kemph, 1978).

It is also questionable that printed materials are effective in conveying information to high school students. The basic source of information about colleges, the catalog, has been described as extremely difficult to comprehend (Norris et al., 1966) and "lyrical, hardly a guide for the perplexed" (Bard, 1969, p. 44). Harris (1968) and Super (1973) have also noted difficulty in getting students to read occupational and educational materials, and catalogs are not directed specifically toward individuals or localities. In short, it is virtually impossible to search through catalogs, selection manuals, brochures, etc. and make an accurate analysis and decision based on their contents (Creative Concepts, 1970).

This is hardly surprising when one remembers that college catalogs are actually a form of advertising by an industry that has begun to seriously employ marketing strategies (C.E.E.B, 1976). Indeed, small colleges endeavor to look large in their catalogs, large universities try to appear small, and all colleges believe themselves to be maintaining highest academic standards (Walton & Mathis, 1967).

Finally, even the human body may hinder our ability to deal with the amount of information we face today. As Tondow (Note 3) points out, while the total amount of information presently doubles approximately every eight years, genetically our bodies have changed little in the last 50,000 years. There is more and more to read, but the eyes and the brain have not changed; they can just absorb so much in any given time period (Tondow, Note 3).

Thus the vast quantity of information we presently face overwhelms our ability to handle it. The difficulty of gathering and maintaining information in what has been defined as good form, while opposed by high costs, marketing attacks, reader reluctance, and physiological considerations, leads Borow (1972) to conclude:

> It may not be unreasonably severe to charge that too many young people make their [college] choices on the basis of misinformation, insufficient information, irrelevant information, or even proper information improperly evaluated. (p. 42)

Problems relating to or caused by counselors. Although many of the problems that high school students encounter in trying to select a college result from the information explosion, a large number of obstacles also derive from guidance counselors and counseling. This is ironic, since we have seen that guidance counselors' responsibilities include assisting in, not hindering, the selection process.

Many counselor-related problems, though serious, are beyond the control of the guidance counselor. The most obvious examples are the physiological factors previously discussed. Even more deficient than our ability to process information, however, is our ability to remember it: It is literally impossible for a counselor or any single human being to remember all that needs to be known (Loughary, Note 5). Human memory has other limitations: We make errors, we forget, and we often have difficulty in selectively recalling data. Man's memory is also affected by bias, personal desires, motives, and needs of which we have little awareness (Loughary, 1966).

If the guidance counselor's memory functions as the primary source of information, then guidance would appear to be on very shaky ground. Counseling conversation, even supplemented by static printed matter for example, is thus a limited vehicle for exploratory purposes (Minor et al., 1969). Bard (1969) estimates that there is about a three year lag between a change in a college's curriculum or entrance requirements for instance, and when counselors start telling students about it. Unfortunately, instead of learning to caution students about the quality of his or her information (Katz, 1966), the guidance counselor often resorts to the vague phrase "I would imagine that . . . ." as an information-giving technique when he or she cannot be definitive (Loughary, Note 5).

Even more alarming is the question raised by Bentley and Salter (1967) which asks whether counselors keep up to date regarding colleges their students are most likely to choose, or students are most likely to choose the colleges their counselor keeps up to date on. The possibility that students' choices of colleges are somehow related to guidance counselors' knowledge of colleges has serious implications for school guidance practice and priorities. It is incumbent upon the counseling profession to either verify or disprove such concerns through thorough research and investigaation of this issue.

Guidance counselors have little control over the student-counselor ratio in their schools, or over the wide range of functions normally assigned to them. Guidance counselors are often responsibile for course registration, attendance keeping, student schedule changes, test administration, analysis, and record-keeping, and many other routine administrative and clerical duties. In addition, they are often involved in crisis intervention, drug abuse prevention, parental assistance, and public relations.

Such a situation dilutes the resources available for counseling and is wasteful of professional counselor skills (New York State Office of Education, 1974). Little time is left for the guidance counselor to assist students in meaningful educational and occupational exploration, planning, and decision-making. Significantly, this predicament also makes planning for and evaluating guidance department procedures, needs, goals, and development in general virtually impossible (Minor et al., 1969; Youst, 1969).

Perhaps worse, since roles are learned functions (Bentley, 1965), a guidance counselor who is delegated numerous administrative tasks becomes a quasi-administrative official (Harris & Tiedeman, Note 7). As a result, the counselor becomes less credible and approachable in the eyes of the student, since he or she is seen as serving the needs of the school more than those of its students. Moreover, as the interface between the college admissions officer and the student, the guidance counselor evaluates the personal, social, and academic characteristics of the student in the form of his or her college recommendation. This dynamic manipulates and harms the student-counselor relationship by putting the counselor in a position of power over the student (Benson, 1967). Indeed, Tondow (Note 3) cites the need students feel to role play when interacting with people of importance and power such as a guidance counselor. As a quasi-administrator in a power position relative to the student's future, the counselor becomes less a person in whom to trust, confide, and from whom to seek help, and more an individual to flatter and cajole, if not avoid. Under these conditions, it is no wonder that students are sometimes reluctant to go to their counselor to discuss future plans (Endicott, 1967).

Another realm in which guidance counselors have little control is in their own training as counselors. Most school counselors began as teachers, and became counselors with little or no training in the information, decision-making, or other scientific aspects of guidance and counseling (McCaffrey & King, 1972; Super 1970). They generally had no vocational development training or experience other than their own (McCaffrey & King, 1972). Counseling on such a basis is extremely limited in comparison to the information available and can be paticularly haphazard (Loughary, 1967b).

As guidance counseling in the schools became more of a profession requiring graduate preparation, one would have expected that counselor training in vocational development would also have improved. Unfortunately, this is only marginally true, if at all, as Burck (1975) explains:

> The academic preparation of counselors has been most distressing and contributory to the present situation; namely, the de-emphasis of vocational counseling and the rather unconcerned fashion in which students have been introduced to it. A survey of most Master's counseling programs would reveal just one course in the area, . . . [which] might occasionally encompass a superficial introduction to several career development theories. Frequently, these courses are dull and taught by junior faculty who have little interest, limited knowledge, and even less skill in the facilitation of career development. Consequently, many students complete counselor education programs where they have acquired few skills or competencies which will assist them on their jobs, and where they have been exposed to little excitement about career counseling as an activity. (p. 8-9)

Indeed, despite the fact that the ability to use occupational information is one of the professional competencies identified as needing professional preparation, it is one of the weakest links in the counseling process (Reardon, 1975).

Unfortunately, this deficiency in most counselor education programs is not merely one of omission; it seriously affects the sense of priorities and values that the counselors-to-be place on their work. During such training programs, counselors come to develop images of themselves as primarily therapists, placing more importance on the clinical personal counseling needs of the few while the masses of students starve for information (Flanagan, 1962, 1969). Reardon (1975) echos this concern, worrying that client-centered counselors might not see the place of information in counseling, and Harris (1972) believes that they do not have a major interest in the dispensing of career information. This situation leads Burck (1975) to conclude that within the counseling profession, low prestige inevitably awaits the counselor whose main interest is facilitating career development. Empirical evidence exists to support this sad claim. Borow (1972) assisted in a study which showed that school counselors ranked students' concerns about vocational choice and planning much lower than the students themselves did.

The preparation a guidance counselor receives, while certainly not attributable to the counselor himself or herself, does affect his or her future functioning in areas where he or she does have control. When a counselor training program fails to address an aspect of counseling in which there is inherent difficulty or counselor reluctance, the potential for counselor incompetence to develop in that area is great. Indeed, many counselors are either negligent or intentionally shy away from learning as much as they can about educational and occupational information. Although many students come for counseling with specific requests for information and decision-making assistance, counselors have chosen to duck the responsibility for developing and maintaining their professional expertise in this area (Reardon, 1975).

Minor et al. (1969) also assert that the guidance counselor's function of educational and vocational orientation is frequently neglected. Burck (1975) contends that:

> Most counselors . . . generally approach the task of career counseling in a singular sort of fashion . . . . [Y]et when dealing with client concerns of a more delineated personal or emotional nature, they usually try to start the counseling process where the client is in his emotional development. . . . Seldom does it seem that the vocational maturity level of the student is taken seriously into consideration. (p. 9)

Other counseling theorists abhor such incompetence as well. Gelatt (1967), for instance, charges that counselors often give advice without having empirical facts, research evidence, or other necessary knowledge to back it up. Loughary (Note 5) similarly laments that only a small proportion of the information normally stored in cumulative folders is ever used by counselors. Tiedeman (1967) warns against the alarming attitude held by many counselors that too much information is a bad thing: "Why rock the boat?" Deciding what to do is certainly much easier when you don't have all the facts (Gelatt, 1967). Bentley and Salter (1967), in a study generally quite supportive of present counselor performance, are only a little more charitable, suggesting that counselors may not know enough about colleges to recommend (or forbid) them to students. In one particularly extreme case of self-serving incompetence, Bentley and Salter (1967) found one guidance counselor who arbitrarily limited the number of colleges to which his students could apply!

Other interferences to students' vocational planning lie within the counselor's locus of control as well. One especially frightening example is counselor bias, most prevalent in what Benson (1967) calls the syndrome of competitive, college-oriented counselor behavior that affects all too many counselors. Research corroborates Benson's description; Ginzberg (1971) found that most guidance counselors have a negative attitude toward post-high school institutions that are not four-year colleges or universities. Trent (1965) found that the vast majority of students who received academic, vocational, and financial guidance for college were those who already were highly motivated and encouraged by their parents. Conversely, Trent (1965) also found when interviewing bright, non-college students that their guidance counselors, almost without exception, had never discussed their ability level with them.

Cooley (1970) also assails apparent guidance office priorities, charging that guidance counselors are more concerned with the here and now than with preparing students for the future. Analysis of the American School Counselor Association's Statement of Policy for Secondary School Counselors (1964) indicates that he may be correct. Instead of being concerned with facilitating the development of abilities, counselors seem more concerned with helping students make choices in terms of the abilities they now possess. They are trying to help students solve problems as they arise instead of developing a guidance curriculum which provides students with planning and coping skills. Loughary, Friesen, and Hurst (1966) generalize these concerns by concluding that many counselors who qualify for masters' degrees and state certification frequently lack the behavioral competencies necessary to achieve many of their stated objectives. This should not be surprising to those familiar with current school guidance practice.

We have seen that the guidance counselor may actually inhibit the vocational development and planning of his or her students due to the limitations of his or her memory, partisan training and resulting self-perception as a therapist, other duties imposed upon him or her, his or her own personal counseling priorities, and often manifest bias and incompetence. Jones (1972) raises the inevitable question of accountability and finds that regarding college and career decision-making assistance, current guidance practice falls far short of satisfactory.

In fairness to the outstanding counselors and guidance programs that do exist. However, to avoid implying that incompetence reigns exclusively in guidance, this writer strongly agrees with Cooley's (1970) remarks:

> I want to emphasize that in characterizing guidance progams in this fashion I am not talking about the few excellent programs that exist in this country; I am talking about the other 95 per cent of the schools and what is going on there. (p. 10)

Other miscellaneous problems. Of course not all the problems that students face in vocational development and planning can be blamed on information complexity or guidance counselors and counseling. Other impediments come from many sources including, ironically, the students themselves.

The fact that students are reluctant to read occupational and educational information, as noted earlier, is indicative of a larger problem: the commonly low level of motivation among students. Osipow (Note 6), Reardon (1975), Rosser (1969), and Super (1973) all offer concerns about the lack of motivation apparent in today's students toward their own vocational planning and development. Rosser (1969) contends that many students suffer from inertia; often going to a guidance counselor seeking to be told which college to attend. Osipow (Note 6) insinuates that a principle of "least resistance" may be operating in career development.

Perhaps most disastrous, the combination of poor information with lack of motivation tends toward cyclic self-perpetuation. The unmotivated student seeks no information, thus likely receives no help in getting information. He or she is not then motivated by the receipt of information (as described by Isaacson (1971)), and thus remains in his or her unmotivated state. College reputations, family or school traditions, parental pressures, and even random events can also affect the student's educational planning in potentially negative ways, leading Holland (1958) to conclude that students often seem to make college choices in the same way that consumers buy household goods.

Another very significant determinant in the way students go about educational planning is the school budget itself. It is axiomatic that with better funding, guidance staff and equipment could expand, thus yielding more time to assist more students more meaningfully. Better funding would also allow career counseling to begin earlier and be more continuous, thus having more impact upon the student (Festinger, 1957; J. Miller, 1970). Unfortunately, however, parents and school boards do not seem to place career counseling very high on their priority lists, particularly given its present effectiveness. Corcoran (1977) also assails the states for their lack of initiative in developing and disseminating occupational and educational information.

Indictment of the Present Situation

The above discussion provides a grave indictment of present guidance methods for providing high school students with occupational and educational information, as well as the ability of guidance counselors to assist students in interpreting and using such information. Although the counselor has been shown to be responsible for both roles, the dissemination of ever greater quantities of information in ever greater complexity for an ever greater number of applications overwhelms and radically conflicts with the counselor's ability, training, inclination, and competence to deal with it. In addition, poor student motivation, low school budgets, and other miscellaneous factors operate negatively as well.

Thus relative to the decision-making model described earlier, students today generally do not know what information they need, and rarely know how to use what information they can get. As a result, college selection is a process that can reasonably be described as inefficient at best, and random or accidental at worst. Under these circumstances, guidance counseling may serve students more as a convenient focal point for blame than as an aid in choosing an appropriate college.

Certainly the counselor has very little influence in the college decision itself, as the research of Borow (1972), Ginzberg (1971), Kerr (1962), Menacker (1975), the New York State Office of Education (1974), Richards and Holland (1965), and Roemmich and Schmidt (1962) demonstrates. Worse, Menacker (1972) found that almost as many students considered the information provided by high school counselors a hindrance to their perception of their college as those that found it helpful. Similarly, Scott (1966) found that about two-thirds of the high school students he surveyed answered the question: "Who gave you what turned out to be the worst advice about going to college?" by naming their guidance counselors.

Some consequences of this lack of effective guidance are readily apparent. Corcoran (1977) cites a study which found that a significant number of college students, had they had better information as perspective students, would not have chosen the institution in which they were enrolled. Similarly, Walton and Mathis (1967) largely attribute to poor decision-making and use of information during the selection process the fact that a high percentage of entering freshmen never finish college. The New York State Office of Education (1974) justifiably concludes that counselors do not seem to exert a significant influence on student decisions regarding college and career choices, and hence that guidance counseling as currently performed is substantially ineffective.

The Future Outlook for High School Guidance

Unfortunately, future prospects offer little hope for significant improvement. Information complexity will undoubtedly continue to increase, while the changing nature of education and work in America will make old information obsolete even more rapidly. Funding for improvements in guidance will also be very difficult to obtain as long as education budgets remain a low priority and inflation continues at its recent historic pace. Meanwhile, though innovation is needed to meet these problems, a potentially regressive "back-to-basics" movement in education is gaining in popularity. Finally, Bentley and Salter (1967) predict that student demand for counseling will continue to increase. We are left with the urgent question: "What can be done?"

There are few options available, and those that exist seem to fall into two basic categories. The first group, characterized by its general goal of preserving the status quo of present guidance counseling, i.e. "leaving well enough alone," might be termed the "passive" alternatives. The second category, denoted as "active" alternatives, is characterized by the goal of full utilization of whatever techniques, tools, and technologies exist to try to deal with the problems facing guidance counseling. (One might postulate a third category, perhaps called the "impossible" options, to include ideas of potential merit that are, for example, too radical to even consider societal acceptance in the foreseeable future, vastly more expensive than realistic use would permit, or for which no suitable technology yet exists.)

It is the contention of this writer that not only is the passive group of options unworkable for modern guidance counseling, but it is based on an inappropriate conceptual foundation as well. The present state of guidance counseling has been analyzed in detail in the previous discussion, and shown to be inadequate in its primary role of helping young people to prepare for their future lives. This is primarily due to its inability to effectively handle the information necessary for planning. To to leave well enough alone is not suitable for counseling in today's confusing, changing world.

The inappropriate conceptual framework of such "passive" guidance options derives from present counselor training and self-perception, which has already been briefly discussed. It is inappropriate because it ignores the realities of the major guidance need of most students: information relevant to, and assistance with, vocational and educational decision-making and planning (Lohnes, 1969; Reardon, 1975). Indeed, the poor quality of the status quo has already forced some "active" initiatives from the private sector in the form of educational consultants who specialize in supplying college information and decision-making assistance to those who choose to pay for it.

Krumboltz (1966b) has declared that the guidance counselor's job is to help students find alternatives, face facts, calculate odds, weigh values, establish priorities, and implement action. Despite the need for relevant information and instruction in using information in personal decision-making, however, Lohnes (1969) asserts that the average counselor sees himself as a therapist who should be applying himself to helping seriously disturbed young people. Relative to Krumboltz's job description, Lohnes' comments and the earlier analysis show that guidance counseling as presently performed is not even successfully accomplishing the first decision-making task as far as educational planning and college selection is concerned; that of aiding in the formulation of alternatives.

MacKinlay (1974) assails the therapist notion by stating that not everyone interested in occupational information or involved in career planning even wants counseling. Reardon (1975) summarizes the inadequacy of the therapist self-image using Dunphy's (1969) decision-making model:

> It is somewhat meaningless for the counselor to focus on [identifying the problem or question, predicting outcomes, and weighing values], where he is probably most comfortable, because the quality of the choice as an outcome of decision-making . . . can be fatally determined by what happens in the . . . information-alternative search. (p. 42)

The question facing guidance counselors appears to be whether they should teach and advise students as their primary role, or generally conduct non-directive personal counseling as they have been trained. While Goldman (1967) is concerned that the introduction of appraisal or environmental information brings "real" counseling to a halt, information and decision-making remain the most pressing and most prevalent needs of the vast majority of students. Goldman's (1967) favored passive alternatives are inadequate when applied to most of secondary school guidance. Goldman's viewpoint, that if relevant information is available, there will be pressures and demands that it somehow be used, is a strange stance for a profession whose task it is to prepare students to cope with the rapidly changing world. The very definition of the word relevance implies that such information must be used.

It seems imperative [illegible] make a professional differentiation between guidance and counseling in the approach, priorities, and training of school counselors. "Guidance" should consist of decision-making instruction, information giving, and those functions previously set forth by Krumboltz (1966b), and it should constitute the majority of the time and effort of the school's guidance personnel. Certainly there should also be one-to-one, personal "counseling" available for student needs, but the first step in the school's guidance/counseling procedure should be to determine whether the needs of a given student pertain mainly to guidance or to counseling. Although some overlap is inevitable, by striving to minimize it both guidance and counseling will benefit from the direction generated by more precisely defining the student's need.

For the sake of conversational and literary brevity, it is certain that both terms will continue to be used generally and ambiguously, even in the ensuing discussion.

However, every school counselor should be trained in both areas, and should be aware, at any given time with any given client, which role he or she is engaged in.

Counseling as a Technology of Helping

Active approaches to school guidance, those utilizing any available tools and techniques, are the only appropriate alternatives for ensuring the competence, perhaps even the survival, of school guidance and counseling. Purveyors of old information soon become as obsolete as their information if they do not use the tools at hand to reorganize their roles and improve their performance for the future.

One active alternative would be to develop and apply an interpretation of counseling as a technology of helping. This idea is hardly as radical or as threatening as it may sound; a "technology" simply requires trained professionals using procedures determined by a guiding theory in order to meet a need. According to this standard, trained counselors employing counseling techniques appropriate to their counseling theories in the aid of individuals qualifies as a technology without necessarily changing present counseling practice in any way (Blocher, 1969; Krumboltz, 1966a; Vriend, 1969).

Gelatt (1967) agrees with this conceptualization, and has proposed the use of information and decision theory as the necessary coherent and comprehensive theory of guidance for direction in counseling. A vital step toward utilizing this conceptualization in school counseling is for the profession to develop clear program objectives and to define the role and functions of the guidance counselor (New York State Office of Education, 1974). This would undoubtedly be a difficult process, but it is necessary, for as Tondow (1967) points out, precisely defining one's objectives makes it possible to have a sharper focus of effort and easier to develop procedures and tools for assessment.

Hosford and Ryan (1970) also suggest several changes in the design and practice of guidance programs toward greater specificity of goals as well as accountability in meeting them. It is critical, for example, to switch the focus of counseling from counselor actions and techniques to client outcomes. Without specifying what a client will be able to do as a result of counseling, we have little or no basis for relating his or her success or lack of it to his or her counseling experience (Hosford & Ryan, 1970).

Within the goal hierarchy thus developed, the next step toward effective guidance in educational and career planning is for counselors, through professional training and personal effort, to change their attitudes toward the use of information in counseling, and become more active in developing their expertise and assuming their responsibility in this area (Reardon, 1975).

Given the great difficulty of efficiently handling the vast quantity of available relevant information, however, a change in attitude alone is only a necessary, not a sufficient, condition for effective guidance. Blocher (1969) contends that in an ideal technology of counseling, counselors would thoroughly understand the area of data processing in order to generate, code, store, retrieve, and communicate appropriate information to their clients. Loughary (1967a) concurs, further suggesting that such understanding would actually assist in defining and meeting the goals of counseling as a technology of helping because the demanding analytical work necessary for building counseling and guidance information systems forces counselors to examine and evaluate much of what they do.

While such in-depth understanding of data processing by most counselors is considerably beyond the foreseeable future, it is true that the counselor's strongest and most dependable lifeline through the storm of college and university information is data processing and programming techniques. These will supply enormous amounts of information, custom-tailored to individual need, with minimum energy expenditure (Stripling, 1967). Without this lifeline, guidance personnel will be in danger of spending much of their time as research clerks rather than as professionals in order to be effective (Bard, 1969). (The alternative course of action is the present one: to sacrifice effectiveness instead of becoming research clerks.)

In conclusion, we have seen that the problems in vocatonal development and educational planning seriously challenge the ability of the counseling profession to deal with them. These problems relevant to the college selection process include little student understanding of, and experience with, the decision-making process; the difficulty in obtaining, maintaining, and using good information; inadequate or inappropriate counselor training, self-perception, priorities, competence, and duties; and a variety of other hindrances. These problems have produced a situation in which guidance is frighteningly ineffective and misdirected. In the future the problems facing school guidance and counseling are likely to be aggravated rather than abated.

In order to face, and perhaps even begin to solve, some of these serious problems, the counseling profession must strive to determine a comprehensive theory of guidance, and with the direction thus provided, proceed to define the objectives, roles, functions, and responsibilities of the school counselor. By doing so, counseling can become more of an applied behavioral science, in itself a technology of helping, subject to the normal rigor of any scientific field.

Without necessarily restricting the freedom of individual counselors, this effort can lend organization, structure, accountability, and even legitimacy as a distinct profession to the counseling programs in the nation's schools. Within such a framework, counselors would be mandated to use every available method to meet their defined goals. Since information handling deficiencies presently constitute the greatest obstacles to effective guidance, the application of electronic information systems seems particularly necessary.

A counselor who can lead the student to capably use information in decision-making and to realize which combination of personal or institutional factors, or both, are most relevant to him or her is approaching his or her ultimate goal (Hansen, 1965). Relative to information and decision-making in the college selection process, the counselor can approach this goal, but only by accepting the concept of man-machine systems (Loughary, Note 5).

CHAPTER III

COMPUTER ASSISTANCE IN GUIDANCE AND COUNSELING

Although the information handling problems of human guidance systems and the information processing capabilities of modern computers seem ideally suited for each other, a close examination of the issues, implications, history, problems, and promise of this pairing is important. Such an overview is essential to the design and implementation of computer-assisted guidance programs, and to the goal of increasing counselor involvement in the use of technology in guidance and counseling.

Since there is enormous variety in the way computers can be used to assist in guidance functions, computer-assisted guidance is difficult to define precisely. As a general definition, Harris (1971) designates computer-assisted guidance systems as systems which use the computer to contribute to personal, educational, vocational, and social decision-making. This contribution can range from simple information giving to complex decision-making practice, values clarification, and prediction of probability of success; and its purpose can vary from counselor support exclusively to complete and direct interactive use by students.

The question of how the computer can help in guidance has at least three components: What the computer can actually do, how that can improve the practice of guidance counseling, and what effects result from application of computers to guidance and counseling.

Information Processing Capabilities of Computers

Before considering applications of computers to guidance, it is important to consider how computers can actually help counselors in their most time consuming activity: providing good information to their students. Computers are not the mysterious, hard to operate brains that they are often thought to be; they are really quite stupid (Sawyer & Kemph, 1978). They basically possess only the ability to input, remember, change (update), manipulate (i.e. compare, assemble, and calculate), and output bits of information. Their usefulness derives from the fact that there is no limit to the amount of information that they can store, their memory is effectively infallible, they can follow alternative courses of action based on the results of comparisons or calculations, and they are extremely swift in conducting their simple functions.

These capabilities are clearly what the counselor needs most in providing good information to students. The ability to rapidly update, add to, or delete stored information allows output information to be as accurate and current as is necessary for the information to be considered good. The use of the computer's comparison ability allows output information to be as general or as specific as the user wants, and in the exact amount requested. Precise information is retrieved, rather than a book. The speed of the computer allows easy accessibility to its volumes of information without delay, and as a machine, it can be made available anytime. Through telephone hook-ups to remote terminals, it can be made available almost anywhere as well. The format of the output information is quite flexible, allowing each installation or user group to receive information in a way that is geared to its needs and characteristics (Sawyer & Kemph, 1978; Walz & Rich, 1967; Hoffer, Note 8).

The final requirements for information to be considered good, that it be unbiased and locally relevant, are dependent not on computers but on the developers of information systems themselves. Certainly irrelevant, biased, or even inaccurate information can be stored in a computer's memory. Super (1978), in fact, has elaborated upon this problem, urging the establishment of one central body to coordinate the collection and analysis of educational information and to make it available to system developers and users. In general, however, developers of information systems strive to obtain the most objective information possible before storing it on a computer. The very fact that the computer outputs its information with consistency and objectivity to everyone also helps to keep it relatively free from bias. It is clear that when properly designed and maintained, computerized information systems can meet the criteria for good guidance information as it was earlier defined.

Improvements to Guidance Through Computer Use

The primary improvement to guidance and counseling which comes with the application of computerized information systems is the greatly enhanced quality of the information available to students. However, computer applications can improve guidance practice in many other ways as well. Some of these ways are mentioned below, then considered later in greater detail.

By providing independent student access and use without counselor involvement, the computer can reduce or eliminate the immense amount of time that the counselor spends in information-giving tasks. Due to this feature, computers can also make information easily accessible to people of widely varying skill and experience in whatever delivery media is most appropriate. Computerized information can provide a springboard for integrating relevant information with student interests, values, aptitudes, and abilities; or the computer can interrelate such information to relevant individual data by itself. Computers can provide values clarification exercises and decision-making practice, and can assist in broadening alternatives for students engaged in career exploration. For those in later stages of decision-making, it can help through an individually tailored process of narrowing down the options available. Further, the computer can simulate conversation in a structured interview, can monitor its use for feedback to the counselor, and through a technique known as time sharing, can handle the information requests of many different students simultaneously.

Perhaps most importantly, none of the above features require great technological sophistication. Quite the opposite, machines capable of handling all of the above functions are much less sophisticated relative to the state of the art, and much less expensive, than they were when Boss (1971) found them able to store and deliver occupational and educational information more efficiently and much less expensively than counselors.

Effects of Computer Applications on Guidance Programs

The introduction of computer capabilities into any guidance program produces a number of effects and changes other than the major improvements in information giving which are intended. These other effects can be categorized as revisions in counselor roles, fringe benefits, and potential problems.

Many of these changes impinge directly on the counselor's tasks, and as such may be threatening to him or her. While counselor acceptance of computer-assisted guidance systems is a larger issue that is later considered in detail, it is essential to note that almost no research has been conducted with the goal of developing a computerized guidance system which would replace the counselor. Although Loughary et al. (1966) and the Systems Development Corporation pioneered the simulation of some counselor functions (e.g., course selection) with the AUTOCOUN system in 1965; and although it is now possible to simulate on a computer most of the functions that Krumboltz (1966b) defined earlier (Price & Johnson, 1973; Super, 1978), all developers consider their systems to be tools, rather than substitutes, for the counselor (Wallis, 1978). Most systems are designed to be extensions of the counselor, to complement his or her efforts by providing the function of information giving (Impelletteri 1967a). Even Super's (1978) advanced work with the Experimental Career Exploration System was designed to free the counselor from most occupational counseling tasks so that he or she could concentrate on the lifetime process of the student's career development. Perhaps Bard's (1969) comment summarizes best: "The idea is not to replace the counselor, but to elminate the dog work that gets in the way of true counseling" (p. 51).

Changes in the role of the guidance counselor. Computerized information systems can assume the guidance counselor's responsibility for information giving which absorbs a large portion of his or her time. Use of such systems, however, necessitates a significant redefinition of the counselor's role in the guidance process. To use computers or to have clients use them means that the image which counselors have of themselves must be sharpened and probably changed (Wrenn, 1970).

Within the framework of the decision-making model explained earlier, if computerized guidance information systems took over the counselor's function of remembering and making available relevant information, then he or she would be free (outside of his or her other duties) to concentrate on the values and predicting/planning aspects of student decision-making (J. Miller, 1970). His or her efforts would then be more appropriate to his or her training, and much more in line with Cooley's (1970) earlier criticisms since concentrating on these two aspects of decision-making addresses the students' future and improves their coping and decision-making skills.

In this revised process of educational and vocational guidance, the first responsibility of the guidance counselor would be to increase the student's awareness of his or her individual values system. He or she would then work toward clarification of those values by considering, for example, the first question posed by Walton & Mathis (1967): "Shall I go to college?" or those posed by Hansen (1965): "What kind of person am I? What kind do I want to become? In what kind of college do I have the best chance of becoming that person?" Exploring the student's reasoning and motivation with him or her would help to transform his or her tacit understandings into explicit ones (Tiedeman et al., 1967). This should be an active and instructive process, for good decision-making counseling brings students directly into a confrontation with their values (Gelatt, 1967). Returning to the analogy of the sieve, the counselor would be helping the student construct his or her personal filtering "utensil" during this period.

As part of this process, the counselor would also teach the student how to use information; a creative, often neglected part of career counseling (Reardon, 1975). Such instruction would include how to determine what information he or she needs, and how to go about getting it. As a result of these efforts, the student would then be in a condition of readiness to accept occupational and educational information.

After the student has obtained the information he or she needs, largely from a computerized information system, he or she would return to the counselor for help interpreting the information and in evaluating and exploring its personal impact to him or her. This latter activity is another very important yet often neglected function of guidance. Since self-concept is central to the perception of information (Goldman, 1967; Reardon, 1975; Rogers, 1951; Super, 1970, 1973), the counselor must attend to the emotional concerns of the student about the information he or she has just procured. As Super (1970) points out, information is not lacking in affective value; it can wound and it can heal. Thus some of the time which the counselor gains by relinquishing the burden of information giving to the computer should be reinvested by sensitively responding to student concerns about the impact of the information on their lives.

Following this, the student and counselor would turn to the predicting/planning component of decision-making. Combining the "internal" data of the student's values and goals with the "external" data of school performance and the just-acquired information, the counselor would help the student construct specific alternatives for action. The guidance process would then turn to evaluating the strength of return of each option, and finally to implementing a course of action.

With better information more easily available through computer-assisted guidance information systems, the counselor must also keep aware of the potentially negative effects of information. In particular, he must guard against the rigidifying effects of information; its ability to perpetuate the status quo. If, for example, more complete information about the student body of a given college is available, then students who perceive themselves as similar to that student body will apply to that college, thus perpetuating whatever type of college it was at the time. In addition, the counselor must guard against the fact that the technological nature of computerized information may lend it more validity in the eyes of the students than it actually warrants. To be able to recognize and compensate for these effects is a skill which the computer-assisted guidance counselor must develop (Goldman, 1967).

It is clear that through the use of a computer-assisted guidance information system, a counselor can implement a career guidance program which concentrates on the values of his or her students, the impact which information has on the students, and the subsequent planning and construction of alternatives with them. By participating in this process with his or her students and teaching it to them, the counselor will not only be providing effective guidance. He or she will be helping the students to understand decision-making as a process, so that it can honestly be said that in making a decision, they know what information they need, where to get it, and how to use it once they have it.

A word of caution may be advisable at this point. At first glance, it may appear that the use of a computer-assisted guidance information system frees the counselor from the burden of information giving and allows him or her time to engage in more personal counseling activities. While this is certainly true in a limited way, such a picture can also be a distortion of reality. It is quite true that the use of a computer-assisted guidance information system frees the counselor for tasks that he or she is more capable of handling, better suited for in training and temperament, and which he or she prefers. Its use may allow different priorities to be set, and some time to be made available for meeting them. It may be possible, for example, to do more group work with students.

However, the time that the computer saves the counselor in information giving will not be entirely available to him or her for other purposes. Some reasons for this have already been noted. Helping students deal with the personal impact of information, guarding against the rigidifying effects of information, and providing in-depth instruction and assistance in career and educational decision-making are such examples. This last function is especially important, for an increase in the quality and availability of information to students without a corresponding improvement in their decision-making ability could produce more harm through confusion than improvement in guidance practice.

Other new demands upon the counselor would come from students who have been stimulated by output information and want to discuss it, or from students for whom the computer has raised an issue which needs personal attention. Both of these are quite likely to be continuous, unscheduled impositions on the counselor's "free" time. Furthermore, the counselor must initially take the time to become personally comfortable with the use of the guidance information system. It is important to keep in mind that data processing can only give precise information at the point of decision making; it does not necessarily save time at the point of decision making. With more information, in fact, the counselor may need to spend more time with each student and his or her parents (Stripling, 1967).

Impelletteri's (1967b) summary of the responsibilities of the computer-assisted counselor indicates that counselors are still not free to become exclusively therapists. Their responsibilities may no longer include knowledge of specific facts about particular colleges or jobs, but they do require an understanding of the world of work, its relation to individual goals and aspirations, and the ability to communicate these concepts effectively with the student. A final caution is advised by Wrenn (1970), who warns that counselors could easily become overdependent on computerized guidance systems much as they became overdependent of testing in the 1930's and 1940's.

Computer applications to guidance can provide more and better information to students, and can relieve the counselor of the multiple burdens of information handling, allowing him or her the opportunity to function at a higher level of performance in other areas. The counselor can thus engage in more activities which better suit his or her temperament and training, but the computer is hardly a panacea for problems in guidance. Since the need for instruction in decision-making remains high, the therapist self-perception of many guidance counselors remains no less inappropriate. The increased amount of information made available by a computer-assisted guidance information system makes it all the more important to recognize and conduct guidance practice as a technology of helping.

Fringe benefits of computerized information systems. The primary improvements to guidance achieved through the use of computer-assisted information systems are in the quality and quantity of the information available to students for career planning, and in the reorganization of the role of the guidance counselor. Many other enhancements to the guidance process and to individual decision-making abilities also result; often in fairly subtle ways. The motivating effects of information (Bohn, 1970; Isaacson, 1971) and the availability of computerized information when the student is ready for it are examples of this.

One obvious result of more and better information and instruction in using it is the broadening of the student's educational and vocational horizons and capabilities. Vocational exploration (as opposed to simple information giving) has been made a goal of many computerized guidance information systems. These systems not only give the student information, but help him or her use it in exploration as well. As a result, not only does the range and accuracy of the student's information increase (Harris, 1974; Watts, 1978; Harris, Note 9), but so does his or her vocational maturity (Drake, Friel, & Tyler, 1976; Harris, 1972; Harris, 1974; Bohn, Lindeman, & Super, Note 10; Harris, Note 9; Harris & Tiedeman, Note 7), awareness of the need to plan (Chapman, Norris, & Katz, 1973; Harris, Note 9; Harris & Tiedeman, Note 7), awareness and use of educational and vocational information sources (Harris, 1974; Myers, Lindeman, Forest, & Super, 1971; Harris, Note 9), and ability to relate information to personal values, abilities, and interests (Chapman et al., 1973; Minor et al., 1969; Harris, 1974). These are major improvements: They all relate directly to the successful construction of workable alternatives in decision-making. Some facets of these advances deserve further consideration.

Implicit in all of the above improvements is the idea that the use of computer-assisted guidance information systems assists in developing the student's own information processing skills. Since an information search with a computerized information system is more structured, dependable, quicker, and less random than with most human information sources, much more of the focus of guidance can shift to process, strategy, and self-concept (Impelletteri, 1969a). With this shift, it becomes important for the individual student to be able to evaluate the merit of varying information and begin to integrate it into a whole. An inquiry approach to learning about colleges and careers is thus fostered. Students learn to ask questions and seek answers, rather than answer questions that others put to them (Walz & Rich, 1967).

The student is also likely to develop more precision of expression, since he or she cannot escape expressing himself or herself in specific, concrete terms, and in the process can hardly help but develop a feel for the kinds of educational and job opportunities that exist (Pierce, 1972). The redefinition and categorization of responses that occurs with computer interaction helps to crystallize the student's ideas as well. Such interaction forces the student to organize his or her thinking about going to college or getting a job; and to weigh the significance to him or her of many basic factors important in the selection of a college or career ("Computer Offers," 1970; Rosser, 1969).

The nearly infinite number of vicarious educational and occupational experiences which the student can have on a computer also help to crystallize his or her thinking.

Guidance counselors seek to give students both information and decision-making experience in career planning. Yet the latter of these is often impossible or overlooked in guidance programs since counselors cannot "give" students experience directly. Counselors can only provide decision-making strategies and information; students have to gain experience themselves. With computerized information systems, however, it is possible for students to practice information seeking and decision-making skills, thus gaining vital experience before they actually have to make the big decisions themselves.

Generally the student has the opportunity to gain such experience when, after vicariously assuming a role of interest, he or she checks his or her interests and abilities against the information that is stored in the computer about that role. Depending upon the results, he or she may revise the originally assumed role in some way (or assume a completely different one), and then see how it relates to the information available. This process of vicarious role assumption and testing can be done as many times as the the student's time and inclination permit; there are certainly no limitations as far as the computer is concerned. Since Katz (1969) calls the freedom to choose and rechoose (construct and reconstruct) alternatives the greatest fundamental in decision-making, the importance of this application of computerized information systems cannot be underestimated.

An especially significant aspect of gaining educational and occupational experience in this manner deserves particular attention. Throughout the process just described, the student is constantly made aware of how his or her choices affect the number of available options (Harris, 1974; Harris & Tiedeman, Note 7). The cause and effect nature of this process is apparent to the student as he or she incrementally broadens or narrows the list of available alternatives by the addition or deletion of individual specifications. In effect, the computer confronts the student with the consequences of his or her choices, thus making the implications of such choices clear.

In personally experiencing processes of such import to his or her future; in comprehending the effect of choices and correspondingly reconstructing his or her alternatives, the student has the opportunity to develop what Tiedeman (1969) has called a "sense of agency." This is the belief that he or she is an important agent in his or her own career development; that he or she has some control over his or her own destiny. The important point here is the student's own belief in his or her effect: One is not likely to plan or attempt career goals if one is convinced that he or she has no control or power over the course of his or her own career development.

Encouragingly, Watts (1978) has shown that a computerized guidance information system can also function as a change agent, altering both students' and counselors' views of career development and decision-making. The fact that students often understand the relationship between high school courses and later occupational possibilities better after using a computer-assisted guidance information system testifies to the existence of this function (Bohn, 1970; Thompson, Lindeman, Clark, & Bohn, 1970; Youst, 1969).

Two additional fringe benefits of utilizing a computerized guidance information system result from the change in the nature and use of information by students using such a system. First, since the computer is a machine, it is completely obedient to the wishes of its operator (Bohn & Super, 1969). A student using a computer-assisted information system is thus in complete control of the flow of information to himself or herself (Harris, 1974; Impelletteri, 1969a; Loughary & Tondow, 1969; Minor et al., 1969; Tondow & Betts, 1969; Tondow, Note 3). This feature of computerized guidance information systems has strong theoretical support. As students move toward information sources where they have maximum control, the impact of the information on their feelings, values, and attitudes probably increases (Reardon, 1975). Reardon (1975) contends that it is the responsibility of guidance not only to provide information, but to provide it in this form as well. Unless the guidance counselor actively helps the student locate and use career information in which the student has maximum involvement, he or she is not really helping in the decision-making process (Reardon, 1975).

Secondly, Walz and Rich (1967) point out that greater use of impersonal information sources has important benefits as well:

> The advantage in using the impersonal information sources is that it brings the user into closer contact with the source of new knowledge. This contact provides the [user] with a ready source of new ideas which he [or she] can adapt to his [or her] own purposes. Conversely, relying on acquaintances for information is likely to restrict an individual's introduction to new ideas and hence, his [or her] capacity to innovate. (p. 279)

Since the ability to innovate is obviously important to the construction of alternatives, these thoughts can apply directly to the career decision-making process.

These two issues, control of information and use of impersonal information sources, seriously question the effectiveness of counselor-provided information, even if the information itself meets the previously defined standards of quality. Despite the near universality of this practice, the student hardly has maximum control over the source of information, and that source is far from maximally impersonal.

While the student's immediate focus in using a computerized guidance information system is on the evaluation and synthesis of information, he or she is also forced to examine and assess his or her own strengths and weaknesses relative to educational and occupational goals. In the supportive, instructive decision-making environment described earlier, the student can learn to make judgements about both his or her own goals and abilities, and the corresponding appropriateness of his or her plans.

This is clearly preferable to having the guidance counselor simply evaluate the student's educational and occupational potential from his or her own very limited experience and knowledge, and then make inappropriate suggestions, as has been shown to be often the case. In short, the selective and progressive nature of computer presentation of educational and occupational information can result in the student's acquiring a more adequate picture of himself or herself in terms of the world of work (Impelletteri, 1967a). By obtaining such a picture early and accurately enough, the student has the opportunity to revise his or her goals, or to modify his or her actions in order to reach goals originally set, rather than being suprised upon graduation (Austin & Ryan, 1971).

Thus through the use of a computerized guidance information system, more order can be introduced into educational and occupational decision-making and counseling. The student can be entirely involved in the decision-making process, actively participating in his or her own career planning, rather than leaving it to others or worse, to chance. In addition, the student can take a greater degree of control over this process, and in doing so can develop an increased belief in his or her own ability to effect change in the course of his or her personal career development.

Some of the fringe benefits of using a computer-assisted guidance information system are due to the human foibles invovled with counselor-provided information. The computer, for example, has no impatience, agenda, time limitations, meetings to attend, or other responsibilities that need significantly impair its guidance function. More importantly, other than the potential danger of initially biased information, a computerized system is remarkably free from most types of bias or discrimination (Bohn & Super, 1969; Loughary, 1966). Very little sex bias has been found in computer-assisted guidance materials (Harris, 1975), and differences between sexes in system use are either minimal or correspond to prevailing differences between high school age males and females in general vocational orientation (Gallo, 1974; Bohn et al., Note 10). No significant differences in system use have been found across grade levels (Gallo, 1974), or races (Bohn et al., Note 10).

Guidance information systems apparently do not discriminate against disadvantaged or less able students either. While Melhus, Hershenson, and Vermillion (1973), and James and Smith (Note 11) found that some disadvantaged students make better progress with traditional individual counseling, Bohn (1970) found that the very groups recognized as needing school guidance most (the non-college-bound and disadvantaged students) were those who responded most enthusiastically to a computer-assisted approach. The differences in these research results may be due to the designs of the particular guidance information system tested, or to the researchers' definitions of "disadvantaged." More research on this question seems necessary.

Bohn's findings regarding non-college-bound students are particularly significant in light of Ginzberg's (1971) research which shows counselor bias against post-secondary educational institutions which are not four year colleges. It should be noted that this bias is probably not entirely the fault of the guidance counselor, since he or she is continuously under both administrative and parental pressure to get more students into better colleges. Through the use of computerized information systems independent of counselor involvement, however, all students have the opportunity to obtain educational and occupational guidance information, not only those selected students for whom the counselor has time available (Impelletteri, 1967a).

Computer-assisted guidance information systems can also subtly improve the counselor's own functioning, while requiring little additional revision in his or her role. The use of such a system, for example, gives the counselor a broader, more national outlook, thus potentially expanding the pattern of colleges to which his or her students apply (Rosser, 1969). In becoming oriented to the system, in the demonstration and training use of the system, and in working with the students who use it, the counselor like the student inquirer, gains new insights into the processes involved (Super, 1973).

Computerized systems can also improve counselor functioning by handling many guidance practices which are clerical in nature. Besides compiling standard reports, for example, computers can pre-interview students so that initial information gathering is completed and counseling can proceed directly (Roberts, 1971). Such systems can also make pratical the development of local norms and the conducting of local guidance research--presently an alarming rarity (J. Miller, 1970; Prediger & Fought, 1972).

A myriad of other benefits can occur with the introduction of a computerized guidance information. Such systems can stimulate communication between students and parents regarding educational and vocational planning and development (Bohn, 1970; MacKinlay, 1974). The use of information systems might also reduce college application fees by allowing more accurate, appropriate selection of fewer colleges to which to apply (Rosser, 1969). The use of information systems quickly reveals gaps in the information structure, either in its own information or in supporting resource materials (Walz & Rich, 1967). Pierce (1972) even suggests that the use of guidance information systems can stimulate students to read.

Some benefits to guidance can arise simply due to the presence of the computer itself. Computer-assisted instruction programs can be developed, for instance, to show students how to prepare for job interviews or locate scholarships. Many applications to guidance not germane to this work can also be developed. Personality testing and analysis is such an example (Finney, 1971; Pierson, 1973; Irwin, Note 12). The many administrative uses of a computer need no further mention here.

Not every computer-assisted guidance information system offers all of these benefits, and some systems offer many more, including many of the counselor functions described earlier, e.g., decision-making and values instruction and practice (Super, 1978). This work, however, is less concerned with what is possible than what is practical. As the state of the art of computer-assisted counseling is advanced, so is the distance between it and actual guidance practice in the schools--research and development alone is not a sufficient condition for use.

The computer-assisted guidance paradigm that has been described above represents a model for the realistic improvement of actual guidance practice in the schools through the limited use of computer hardware and software which would not be prohibitively expensive for most present school systems. Further elaboration upon this writer's perception of what is realistic and practical will be found in the next chapter.

Obstacles to the Acceptance of Computer-Assisted Guidance

As is evident from the scarcity of computer-assisted guidance information systems in school guidance practice, there must exist forces which work against the acceptance of such systems. Some of these obstacles are quite practical ones; others are more emotional. Some are reasonable; others are quite irrational. The major factors are: (a) lack of familiarity of both counselors and the public with computer-assisted guidance systems, (b) the apparent deterministic, impersonal, and dehumanizing nature of such systems, (c) the personal, rather than technological, orientation of counselors, (d) the accuracy of the computer as opposed to the fallibility of the counselor, (e) the threat to the counselor of loss of control over his or her work schedule and methods, (f) the perceived threat to the counselor's job security, (h) the potential for invasion of individual privacy, (i) the cost of computer systems. In analyzing these obstacles, the writer is greatly indebted to Super's (1970, 1973) articulate and inclusive treatments of the problems hindering acceptance of computer-assisted guidance systems.

Familiarity with computer-assisted guidance systems. The first major obstacle to the acceptance of computerized guidance systems is the public's and the counselor's unfamiliarity with the nature and goals of such systems. Anything new, whether people, procedures, or devices, tends to arouse fears and suspicions in those unaccustomed to innovation. One need only look at the suspicion and derision accorded some of the nation's major advances in transportation while they were in their infancies to see that this is part of our character. Yet how is the unknown to become known, the strange to become familiar, the threat to be made reassuring (Super, 1973)?

Through opportunities to observe the use of computer-assisted guidance systems, to participate in demonstrations of such systems, to actually use the systems, and to communicate and work with other users, familiarity can be acquired. To promote greater acceptance of computerized guidance systems, such systems should be demonstrated at professional meetings, in workshops, and even in counselor education courses. In addition, systems should be demonstrated at schools where they are currently in use. Counselor training sessions would probally benefit from being conducted in the relative familiarity of an actual school site.

Since what 'I helped make' is more likely to be used and used well than what 'they imported' (Super, 1973), the involvement of counselors in the development or refinement of guidance information systems increases the likelihood of their support. J. Miller (1970) elaborates further on the involvement of counselors, suggesting that their responsibilities can include communicating student information needs to system designers, consulting on psychological factors which might affect student use of such systems, serving as a trainer in the use of the systems, helping to legitimize the use of the system by students, and providing feedback to the developers on the students' reactions to the system. The counselor can further assist by helping to identify and implement necessary changes in the system.

Since these functions are vital to the development of an effective computer-assisted guidance information system, both the goals of sound system development and of counselor familiarity through involvement can be achieved in this manner. Verifying the wisdom of involving counselors in the development, refirement, and maintainance of guidance systems is the success of the Computerized Vocational Information System (CVIS) developed by Harris and her fellow staff associates at Willowbrook High School in Villa Park, Illinois; and IBM'S Educational and Career Exploration System (ECES), which was developed, field tested, and revised with the assistance of school counselors.

Impersonality, dehumanization, and the appearance of determinism. Super (1973) provides much insight into the fears of both counselors and the public of the apparent deterministic nature of computerized guidance systems, and the possible mechanization of life which may result:

> When a person sees a causal connection, as when the counselor's knowledge of human abilities and human behavior leads him to believe that a student's choice of a certain course will lead to failure, this is likely to be viewed as insight or understanding. When a statistical formula is applied to the same data and goes through the same logical processes, this is likely to be called determinism. And when computers are programmed to use these data and to go through these processes, the cry of mechanization and dehumanization is likely to be raised. (p. 301-302)

Super (1973) also points out that ideas and facts are not inherently deterministic; determinism is a function of the way that ideas and facts are used. As such, computerized guidance information systems are exactly as deterministic as their designers and developers plan them to be. Similarly, counseling is as directive or non-directive as the counselor wishes it to be. Books and kits about occupational choice or life/work planning are also as highly directive or non-directive in their intended use as their authors desire them to be. Computer programs, like these or any aids, are only as good as the men who write them; computers only do what they are programmed to do.

The fear of determinism or dehumanization in well designed guidance information systems is alleviated by actual experience. No counselors, parents, or pupils criticized either ECES or CVIS for determinism or for dehumanization (Super, 1973). Most research indicates that students actually like to use computers. They enjoy the feeling of personal involvement in using computers, and do not feel dehumanized by them (Chapman et al., 1973; Friesen, 1965; Harris, 1974; Myers et al., 1971; Bohn et al., Note 10; Harris & Tiedeman, Note 7).

In some situations, students even prefer to interact with a computer rather than a human (Cooley & Hummel, 1971; Pierce, 1972; Roberts, 1971; Watts, 1978): They feel free to express their feelings without inhibition (Watts, 1978), concern for human reaction (Loughary & Tondow, 1969), or the need to role play (Tondow, Note 3). Pierce (1972), for instance, believes that some students won't go to talk to a counselor--for them the impersonality of the machine is an important factor. Tondow and Betts (1969) maintain that students find the impersonality a relief. Such acceptance comes as no suprise to Loughary and Tondow (1969), who recall that young people have long accepted and used a machine in expressing their needs and emotions: the automobile.

Students also enjoy being in control of the computerized interaction (Loughary & Tondow, 1969; Tondow & Betts, 1969), and trust in the computer's lack of bias (Tondow & Betts, 1969). Students participating in Tondow's (Note 3) research, for example, were pleased that the computer treated them no differently than any other student. In their eyes it was absolutely fair.

Impelletteri (1967a) and Loughary et al. (1966) suggest that the question of impersonalization may be a non-issue in light of Gilbert's and Ewing's (1965) research into the need for personal interaction in many standard educational and guidance functions. This research indicates that while the personal relationship factor is not totally unimportant, it has been overemphasized in teaching, counseling, and probably psychotherapy. Walz's and Rich's (1967) argument regarding the advantages of impersonal information sources would seem to support this idea.

Walz (1970) further argues, with support from Cooley and Hummel (1969) and Impelletteri (1967a), that the issue of dehumanization has two sides:

> Mention technology and you are sure to raise for many people the spectre of a depersonalized and controlled society that is horrifyingly described in Orwell's 1984 (Orwell, 1961). . . . As dramatic as that argument may be, at least as cogent a case for the opposite may be made. In our complex world, only technology can preserve and make possible the freedom and rights of man that we cherish. The enormous storage and memory capacity of the computer provides the means to respond to people as individuals, though their great numbers defy any but the grossest identification and impersonal response

> by any means other than the computer. (p. 177)

Indeed, Impelletteri (1967a) goes so far as to declare that computer-assisted guidance information systems may well become the most humanizing element ever introduced into American education.

Counselor orientation. Probably one of the most serious obstacles to widespread and effective use of computer-assisted guidance information systems is the personal, rather than technological, orientation of most counselors. For most counselors, the opportunity to work with people was one of the major reasons they entered the profession. Many school counselors were once teachers who found themselves more interested in students than in subject matter and instruction. Few were trained in the sciences or technology (Super, 1973). As a result, the very word "computer" can be frightening to the non-scientifically oriented teachers who went from teaching into counseling without adequate training in the sciences of pedagogy and of psychology (Super, 1970). Even the rigorous logic of computers; logic more familiar to the scientist or mathematician, is strange and threatening to many counselors.

The counselor newly exposed to computer systems thus needs help in learning a new thought process, a new way of ordering ideas and data, and a new way of solving problems (Super, 1973). Once oriented, however, the counselor is likely to appreciate the regularity and manageability of computer systems. The prior orientation of the counselor makes the need for effective familiarization and training programs all the more essential.

Computer accuracy versus counselor fallibility. Another reason why counselors may consider a computer-assisted guidance information system unwelcome is its near-complete accuracy. Computers can and do make mistakes, but they are usually due to some original human error in typing, reading, or programming. Once a system is installed and made operational, errors are not likely to occur, whereas human error and forgetting occur at unforeseeable times and with erratic frequency (Super, 1973).

As if infallibility were not enough, the counselor knows that the computer can remember vastly greater amounts of information about colleges, occupations, and even student performance than he or she can. The computer can also locate data far faster and with probably greater selectivity than he or she can. Thus when the counselor views himself or herself as a source of information, the computer becomes something of a threat because the computer can do that kind of job much better than he or she can (Super, 1973). The need for effective training programs to gently introduce the newly exposed counselor to his changed roles is again made manifest.

Threat to the counselor's control over work activities. One of the features that school counselors most like about their work is their freedom from physical and temporal constraints relative to others in the school environment. Counselors generally do not have to respond to bells, restrict their movements, or put up with such procedures as giving examinations to evaluate their clients' progress. Their days are comparatively varied, and to a great extent, they can determine each day's course of events. Indeed, within broad limits, counselors have few restrictions on their work schedule or methods.

A computer-assisted guidance information system imposes additonal routines and constraints on the counselor, reducing his or her cherished control over his or her work behaviors. Although the computer spares him or her the time and trouble associated with information giving, it makes additional demands upon him or her as well, as has previously been illustrated. Guidance systems can stimulate students to seek more counselor aid, and as a result of using such a system, students will often be armed with information that the counselor can get, but does not have at hand. Student system users are also likely to pose less trivial questions, since guidance systems promote an inquiry approach involving better research and formulation of questions. The system may even refer students to the counselor directly, as is presently the case in some systems. At the very least, the counselor will need to train students in the use of the system.

Having achieved secure status as a professional, the counselor may be reluctant to return to "beginner" status in order to learn the use of computerized systems himself or herself. Content as he or she stands, why introduce the anxieties of "freshman" status regarding computer-assisted guidance systems? Indicative of the counselor's somewhat counterproductive need for security is Van Dalsem's (1969) finding that counselors are reluctant to give up record-keeping even after their schools change to computerized records. Whether labelled inertia, apathy, or tradition, these factors surely present obstacles to counselor acceptance of such systems.

In short, the computer-assisted counselor will probably face more demands from individual students requesting more profound assistance, and for at least an initial period, may feel uncertain and uncomfortable responding to these computer-assisted demands. The importance of counselor involvement during the design and testing of systems is once again illustrated by the need to anticipate and minimize counselor resentment to this computerized interference in his or her work schedule and methods.

Threat to counselor job security. Although all system developers (many of them counselors themselves) regard their products as tools to aid the counselor, it is not at all clear that counselors feel the same way. Perhaps considered too "childish" a reason to impede the progress of computer-assisted guidance, the subject of job security is rarely acknowledged or discussed explicitly. In the opinion of this writer, however, this anxiety not only exists, but is a strong impediment to counselor acceptance of computer-assisted guidance systems. Despite the therapist self-perception that many counselors maintain, the fact remains that many counselors function largely as information sources. The apparently sizeable percentage of these counselors who perceive the status quo to be adequate may not even conceive of a higher level of counselor function than information giving, and thus are in fact, in a direct conflict of roles with a computerized system. Obviously such counselors will not support or accept computer-assisted guidance systems that in any way jeopardize the status quo. Unfortunately, in such situations Impelletteri's (1969b) thoughts probably hold true:

> Schools in which counselors are least likely to accept a guidance system approach need most improvement, and conversely, schools in which the counselors are most likely to accept a guidance system approach need least improvement. (p. 118)

Even in the perhaps unjustified hope that this description does not represent the majority of present school guidance personnel, there is still sufficient reason for counselors to be antagonistic toward computerized systems. The United States has a national heritage of building machines to do peoples' work. Particularly over the last decade, our minds have been conditioned to disdain automation because it "deprives people of their jobs." Despite the fallacies of this conceptualization, and despite the fact that we welcome automation in terms of labor-saving devices and lower prices, the sentiment remains: Automation is bad. As an emotional response, logic can do little to counter this sentiment.

Super (1970) illustrates and summarizes this obstacle to the acceptance of computer-assisted guidance systems in an amazingly insightful, sensitive, and accurate analogy relating the present situation of information-giving counselors to that of the ancient Druids:

> The Druids, the living storage and retrieval system of the ancient British and their Irish counterparts, must have had similar negative feelings about the introduction of writing and of books. The laws of the land, the genealogies of the clans and of the noble and royal families, and all other such knowledge and wisdom extant in their day were memorized by priests-in-training. They later drew on this knowledge when questions arose as to succession to leadership as king or chief, as to the inheritance of property, and as to religious doctrine. When books were introduced, the Druids and their apprentices must have felt terribly threatened by these mysterious new devices with their complex input-output methods and large storage systems, and by the new wise men who introduced them into the realm. They must also have been threatened by the infallibility of the book, by the superior accuracy of its storage and retrieval processes. But books and libraries, and the teaching of reading and writing, instead of the rote memorizing of genealogies, laws, and doctrines, were in due course accepted, if not by the Druids, then by other priests and scholars, wise men who recognized the potential of the new tools and mastered them. (p. 103)

Invasion of privacy. The invasion of the privacy of individuals through the storage and retrieval capabilities of computers has been a concern for some years and still presents a significant danger. Lister (1970) has analyzed the privacy issue in detail, and has isolated the major threats to individual privacy.

The efficiency and memory capabilities of computer systems have improved markedly over the past decade and will likely continue to do so in the future. These developments have benefitted us greatly, and indeed, make possible the types of computer-assisted guidance information systems discussed herein. However, as system capacty and efficiency improves, there is less physical need to restrict the amount of data which is retained. Thus improved systems can store more data about individuals than earlier systems. A direct corollary to this is that data which used to be discarded can now be saved (Lister, 1970).

The use of any computer, as opposed to other methods, allows data to be used more completely in whatever process it is being used. In addition, computers permit wider and faster dissemination of information for whatever purpose the user desires. When this is coupled wth the appearance of legitimacy that computer output provides, (i.e., the seemingly enhanced value of information which is computerized), it is clear that computer use can vastly compound the harm done by inaccurate information (Lister, 1970).

Unfortunately, since the actual use of computers is not well understood by the public, and since the procurement and/or dissemination of information with a computer can be quickly and quietly accomplished leaving little trace, it can be very difficult to recognize or locate abuses of recorded information. Lister (1970) has proposed some actions which could help prevent information abuse.

The concept of ownership of information about oneself is paramount. A guiding principle for information users should be to maintain the individual's right to control what information about him or her goes where for what purpose. This principle should apply equally to private data sources too, since the public good must be their highest priority. Lister (1970) also suggests that restrictions be placed on the quality and character of information that can be collected and retained, and that limitations be enforced as to who can get or use the information. In addition, all information kept about an individual should be available for periodic review by that individual. As for information used in research, projects should use prior consent or at least maintain individual anonymity. Research projects should be valid, worthwhile enterprises, the investigators should be fully qualified, and information gathered for one research project should not be given to others. Finally, as a deterrent to information abuse, criminal penalties should be instituted, and the ability to recover damages should be recognized.

It is clear that since Lister (1970) proposed these ideas, many of them have come about. The right of a individual to gain access to information stored about him or her is now nationally established, and many states now enforce criminal punishments for abuse of computerized information. Despite this progress, the problem is hardly solved. Avoidance of information abuse demands constant awareness that one may be invading the privacy of another person.

The fact that computerized information lends itself to large scale abuse again illustrates that computer systems are only as good as the men and women who design, build, and use them. Fortunately, experience to date with guidance information systems appears to be positive in this regard. In the cases of ECES and CVIS, neither the townspeople in general nor the systems' users showed any fear that their privacy was being invaded (Super, 1973).

Cost of computer-asisted guidance systems. Probably the most commonly cited obstacle to the widespread acceptance and use of computer-assisted guidance information systems is the expense of the hardware and the software necessary to make such a system operational. Yet this reason alone is by no means sufficient to prevent the adoption of some form of computer assistance in guidance.

The CVIS , for example, is in the public domain and thus has no software cost. Of course, a school or supervisory union must have the hardware, a computer and its peripheral equipment, on which this software can run, but many schools do in fact have computer facilities of some sort to handle administrative and/or educational functions.

For example, of the 165 secondary schools and school districts listed in the Academic Computing Directory (HumRRO, 1977) as exemplary institutions in academic computing, only 57 (34.5%) indicated the use of any guidance software. Thus computer-assisted guidance is lacking even in schools and school districts with significant computer facilities and exceptional talent at utilizing them. Though compatibility between hardware and software is sometimes a problem, it is clear that more school systems could implement computer-assisted guidance in some form, at little expense, than presently do so.

Tragically illustrating that cost is not wholly to blame for the lack of computer-assisted guidance in the schools is Lambert's (1977) experience with the Wisconsin Occupational Information System (WOIS). This system ran as an inexpensive pilot program for many schools in that state, yet some counselors could not find the time to implement the program, or else cited the inconvenient location of the computer terminal as inhibiting their use of the system.

The above discussion suggests one of the more successful ways to obtain computer-assisted guidance systems. When a school decides to purchase (or lease) a computer system and/or administrative software, counselors should lobby to have such software include a guidance information system. Many counselor-administrative support systems, including CVIS and DISCOVER (Harris & Tiedeman, Note 7), also contain student-accessible guidance information systems. It is thus possible to include, or "hide", the cost of a guidance system among the costs of a general adminstrative computer system, with relatively little additional cost. In short, schools do not have to expend exorbitant sums for guidance systems alone; programs supporting many educational and administrative functions can run on the same hardware, often simultaneously.

Of course the essence of the cost issue is really the cost/benefit ratio; the expense of a guidance system versus the value or usefulness of its results. Relative to the above discussion, the inclusion of a guidance system with an administrative system increments hardware costs little, so the cost/benefit ratio is improved.

Costs for guidance systems can be fairly easily determined, and range between $2.00 and $6.00 per hour of student use for currently operational systems (Harris & Tiedeman, Note 7). However, since many system costs are fixed, greater student use reduces the per hour cost, as does amortization of hardware and software costs. As a result, multiple sessions at a computer terminal to carry on a personalized dialogue about vocational decisions will eventually cost little if any more per pupil than the price of a good book (Super, 1973). Due to consistent increases in computer power per hardware dollar, that point may have already been reached.

Thus the primary consideration in the cost/benefit ratio is not the dollar outlay, but the value which the community places on the benefits derived from a computer-assisted guidance information system. This value is not easily generalized or determined; it depends on many factors that are different for each community, and on many individual subjective evaluations within each community. Furthermore, the results from a guidance system are neither tangible (e.g. increased vocational maturity), nor are they something the average taxpayer has experienced himself or herself.

In trying to assign a value to the benefits derived from a computer-assisted guidance information system, one comparison must be stringently avoided: the forced choice between counselors and such systems. The absurdity of this comparison is illustrated cogently by Super (1973), who submits that the same forced choice could be applied to books and English teachers, laboratories and science instructors, and workshops and industrial arts teachers. In each case, the former items are teaching aids to the instructors involved. A forced choice between counselors and information resources is an equally spurious dichotomy. They are complementary, not competing items in a budget (Super, 1970).

The real question in the eyes of the community is what aids should the counselor have in order to do his or her work well, and which of these in what quantity can it afford? Essentially, how good a support system is the community willing to give its students and counselors (Super, 1970, 1973)?

In conclusion, the obstacles to counselor and community acceptance of computers as counseling aids are real, but not insurmountable. Orientation, training, and familiarization activities are particularly vital for both the counselor's and the public's awareness of the benefits of computer-assisted guidance. Such training can diminish the counselor's perceived threats of technology, of exposed fallibility, and of loss of control over work behaviors. Meaningful involvement of counselors in system design, implementation, and use, as well as competent and sensitive programming, can remove the fear of dehumanization and determinism in using computers. The issues of privacy and cost are largely ones of awareness. School officials must be constantly sensitive to potential invasions of privacy and abuses of information if it is to be best avoided. A public made aware of the significant personal benefits that young people can derive from a computer-assisted guidance information is much more likely to be willing to pay for such a system (Bohn, 1970; Super, 1973).

An Historical Perspective on Computer-Assisted Guidance

A number of very serious problems hindering effective school guidance have been isolated and analyzed. Many suggestions have been offered which could improve the generally poor performance of school guidance personnel. Yet nearly all of the problems and potential solutions considered here have been recognized for nearly a decade. If the present state of school guidance were not disturbing enough in itself, this lack of progress toward improvement in guidance during the last ten years is truly alarming. In order to gain a better perspective on this lack of progress, a review of the development and characteristics of computer-assisted guidance information systems seems appropriate.

Origins. In the 1950's, as computers turned from mere calculating machines into information storage and retrieval devices with significant memory capability, business revolutionized its procedures. Education, however, has been far more resistant to similar change, despite the similarities of many tasks facing both business and education. By the early 1960's, computers were marginally involved in education, handling such "businesslike" administrative and clerical functions as payroll accounting, grade reporting, student scheduling, and student recordkeeping (Harris & Tiedeman, Note 7). The direct use of the computer by the student, however, either for programming, computer-aided instruction, or guidance purposes, did not begin until the mid-1960's, and its continuation at the high school level remains in doubt even today (Harris & Tiedeman, Note 7).

In late 1964 and early 1965, John Cogswell of the Systems Development Corporation in Santa Monica, California began to investigate the possibility of computerizing vocational guidance information and functions. Together with John Loughary and others, he developed the first major experimental computer-assisted guidance system, AUTOCOUN, aimed at simulating some vocational guidance functions of counselors. In doing so, these researchers pioneered the first computer models to simulate any counselor function, thus discovering and defining many of the problems and constraints involved (Borow, 1973).

Later development. Cogswell's and Loughary's work demonstrated the operational feasibility of student information systems capable of direct interaction with the students themselves (Loughary et al, 1966), and immediately the idea caught fire within the vocational counseling profession. By 1970, over 45 computer-involved guidance projects had been attempted, and 25-30 of them were actually in existence at that time (Harris & Tiedeman, Note 7). Similar development occurred in Canada (Gallo, 1974; Hallworth, Gallo, Herman, West, & Woodsworth, 1970) and in Great Britain (Closs, 1978; Wallis, 1978; Watts, 1978).

Strangely, the development of computer-assisted guidance was quite non-evolutionary. AUTOCOUN was not only the earliest system, but one of the most sophisticated as well. Unfortunately, work on this system was largely stopped after the feasibility of such systems was demonstrated, primarily due to an inharmonious research and development team (Super, 1978). Similarly, the Information System for Vocational Decisions (ISVD), which Tiedeman and his colleagues at Harvard brought to prototype form in 1969 was the most sophisticated system ever attempted, but it failed well before completion due to funding problems (Super, 1978).

Lesser systems than these took their places, with development proceeding from simple information storage and retrieval systems, through non-interactive and then interactive person-college and person-job matching systems, to exploration systems which aid the counseling process by querying, summarizing, and analyzing responses. These were followed finally by career development systems based on developmental models of career development (as opposed to addressing single unrelated decision points), which teach about developmental stages, assess vocational maturity, and provide guided and evaluated exploratory opportunities (Super, 1978).

Even this growth and development was not particularly evolutionary, since more or less sophisticated systems were developed based more [illegible] local needs and budgets than on the state of the art at the time. Due to the increasing significance of computer-assisted guidance systems to guidance practice, however, and to the communication problems brought about by a large number of projects with varying objectives and procedures, the National Vocational Guidance Association (NVGA) proposed a sorely needed classification scheme for dividing the different types of computer-assisted guidance projects into four categories (Harris, 1971). Later Super (1978), differing slightly, enlarged and elaborated upon these categories, which are: (a) indirect inquiry systems, (b) direct inquiry systems without monitoring, (c) direct inquiry systems with system monitoring, and (d) direct inquiry systems with system and personal monitoring (Harris, 1971; Harris & Tiedeman, Note 7). Two types of systems were omitted from this classification scheme, information storage and retrieval systems, and exclusively counselor-support systems.

Information storage and retrieval systems. The simplest type of computer-aided systems, information storage and retrieval systems, reap some of the benefits of computerization described earlier, like ease of updating, but are basically information depositories such as agency job banks. From the point of view of the user, they are static, rigid, and impersonal, able only to respond to requests for more data or to terminate the interaction. In bulk form and not tailored to individual interests, values, or readiness, much of the data is irrelevant to any one user. The Career Information System (CIS) in Oregon is one such system, although it contains descriptive occupational data, rather than simple job availability information (Super, 1978). A typical user of such a system might be an unemployed worker investigating the demand for his skills in other locations, or a student wishing to get a description of a particular occupation.

Counselor support systems. Although many systems have previously been mentioned which support the counselor's "other duties" (such as attendance and schedule-changing) as part of a complete guidance, administrative, and educational package, some systems were designed to support the counselor exclusively in his guidance role. Such systems often provided information necessary for student decision-making, but provided it only to the counselor, not directly to students themselves. While probably less threatening to the counselor than systems with direct student access (the counselor need not fear replacement, change his or her work behaviors much, or worry about fallibility when only he or she uses the tool), such systems would necessarily maintain many of the guidance problems discussed earlier which are directly related to or caused by the counselor. This type of system would also require a great deal of the counselor's time if he or she were to do for each student what almost any direct access system could do.

The most noteable counselor support system was the Bartlesville Total Guidance Information Support System (TGISS) developed by Roberts (1969) at Oklahoma State University. Other systems, some approximating simple information storage and retrieval systems, have also been designed and implemented for state-wide information needs. One such example is the Nebraska Vocational Information System (NVIS), used to collect and statistically analyze educational and vocational data for that state's Department of Education (Mendenhall, 1977).

Indirect inquiry systems. Indirect inquiry systems have been described by Super (1978) as simple matching systems. Most such systems utilize batch (as opposed to interactive) computer processing, and thus use the computer more for its storage and matching abilities than for its powers of rapid communication (Super, 1978). Each user's request is generally held until a sufficient number of requests accumulate to warrant processing; a delay of at least hours and perhaps weeks before the user receives the results. Due to this delay, and the costs commonly involved, users generally submit only one query (Harris &

Tiedeman, Note 7).

Other serious liabilities of indirect inquiry systems include the fact that the user does not know which of his or her chosen criteria limits or otherwise affects his or her options, and thus cannot alter his or her choices accordingly for further feedback: He or she remains unaware of the precise narrowing process. Without this, little development in the student's own personal ability to process information or make wise decisions results from participation in the process. In addition, the user receives no counseling or aid in using the results in decision-making except a minimal amount perhaps contained in printed instructions (Harris & Tiedeman, Note 7).

Characteristic of such systems were the many computerized college selection services that existed in the late 1960's and early 1970's, described and listed by Bard (1969) and Rosser (1969). The user of such a service would typically fill out a questionnaire indicating his or her interests relative to college and send it, along with a fee ranging from $5.00 to $20.00, back to the service. A few weeks later, a list of matching colleges would be sent to him or her.

However, quality varied widely among these services, and they were generally fairly expensive, most of them being motivated by profit. Dworkin (1970) illustrated the lack of reliability among such services by recalling an experiment in which a test high school senior sent his college criteria to 12 different computerized college selection services, and received widely varying responses, some of them extremely inappropriate. Because of the above inadequacies, the cost/benefit ratio in using these systems was poor (Creative Concepts, 1970; Menacker, 1975). Thus despite the fact that approximately 15-20 commercial college selection services were operating in 1969, only one indirect inquiry system was in operation in the United States in 1974 (Harris & Tiedeman, Note 7).

Direct inquiry systems without monitoring. Direct inquiry systems vary widely in sophistication, capability, orientation, and emphasis, but all allow the student (or other inquirer) direct, personal access to the system's programs and data files through the use of a computer terminal. The simplest type of direct inquiry system is that without any kind of system or personal monitoring.

Typically the user of such a system works to narrow down the number of options available to him or her to a manageable quantity by specifying criteria he or she desires in a college or occupation. These criteria are generally in the form of coded words or numbers, which the student has learned or has available in supporting manuals. The interaction progresses when, as the student specifies characteristics he or she wants, the computer returns the number of colleges or occupations meeting all of the specified criteria. When that number drops below a predetermined level, the user may have the remaining colleges or occupations listed at his or her terminal (Harris & Tiedeman, Note 7).

Direct inquiry systems compare very favorably with indirect inquiry systems since the user's request receives nearly instantaneous attention, and he or she is constantly aware of how his or her chosen characteristics affect the number of options available. In addition, the user can try vastly different sets of criteria over multiple uses of the system, thus gaining in awareness due to the different lists of alternatives produced. Since taxpayers or grants generally pay for such systems, there is no per use fee charged the student, and hence no financial limit to the number of trials he or she can make. Also, while no personal feedback is generally attempted in such systems, they are usually designed to promote counselor participation and collaboration (Harris & Tiedeman, Note 7).

In 1974, Harris and Tiedeman (Note 7) counted only four direct inquiry systems without monitoring in operation, and by 1978, just one major system remained, the Guidance Information System (GIS), marketed by Time Share Corporation (Super, 1978). (Another similar system, the Oregon Information Access System (OIAS), was apparently absorbed into the Career Information System (CIS) in that state (MacKinlay, 1974).) While GIS is mechanically interactive (i.e., the user can specify criteria, get the corresponding information, change the criteria, get the new information, etc., many times over), it does not meet Super's (1978) standards for an interactive matching system. GIS does not permit a psychologically interactive dialogue, including questioning, as well as answering, the user.

Interactive matching systems, those which can relate educational or occupational data to the user himself or herself (based on his or her scores on aptitude tests or interest inventories), did not survive very long in the United States (Super, 1978). Due to rapid developments in system design and in technology, such systems were virtually obsolete before they reached completion. Impelletteri (1967b, 1969a) did much work on such systems through his efforts on the Computerized Occupational Information System (COIS), but his premature death prevented further development on that project (Super, 1978).

Matching systems in general also faced difficulties because they were also significantly inferior to concurrently developing direct inquiry systems with interactive exploration and choice capabilities. In matching systems, exploration results primarily indirectly as the user tries many different criteria sets and receives the resulting lists of options. This limitation is due to the fact that such systems characteristically serve only to narrow down the number of options available. In direct inquiry systems with monitoring, however, actual computer-assisted broadening and exploration is possible.

Direct inquiry systems with system monitoring. When a system is so programmed that the computer stores and analyzes the responses and choices of the inquirer, relates them to individual data stored about the inquirer, and then summarizes and interprets them, thus making the inquirer in effect a client, this process is called monitoring (Super, 1973). This interpretation process is usually accomplished in accordance with a decision table determined by the system designer, stated in terms of probability of success for a given alternative, and then reviewed with the inquirer (Harris & Tiedeman, Note 7). Clearly the ability to summarize responses and suggest alternative directions, as well as to evaluate the consistency of the user's decision-making process, makes a direct inquiry system with monitoring an extremely powerful vehicle for exploration and choice.

Besides possessing all of the characteristics of direct inquiry systems in general, systems with monitoring allow a wide variety of scripts, approaches, modes, and branching opportunities, thus permitting the direct exploration and vicarious experiences earlier described. Users of monitoring systems can generally access the system's data files through a variety of search strategies. Characteristically such systems store individual data to later be meshed with educational or occupational data, which can in turn generate new and personalized data. Because of this capability, and the ability to monitor and occasionally display the decision-making path of the user, such systems can provide some formalized counseling (Harris & Tiedeman, Note 7).

Typically student interaction with a direct inquiry system with monitoring involves system questioning of the student through a multiple choice format. In a similar fashion, the inquiring student can ask questions of the system. Most such systems summarize periodically for the student so that he or she may review the issues that have been covered, the positions which have been taken, and the decisions which may have been made. Some systems occasionally analyze these decisions to identify consistent trends and whatever inconsistencies may have become manifest (Super, 1978).

The exploratory power of these systems has progressed far beyond the simple dumping of blocks of information to the terminal, to a point where systems can ask what the student would like to know about an occupation or college that he or she has chosen to explore. The student's reaction to this information can be used as a springboard for further interaction, thus allowing step by step acquisition of information (Super, 1978). Since the user can move freely from one college or occupation to another and back again, genuine browsing is possible (Super, 1978). During this process, the congruence of the user's choices with his or her stored interests, abilities, and values can be noted and clarified by the computer. The student's information processing abilities, decision-making skills, and focus in life can be greatly enhanced as a result of these experiences (Super, 1978; Harris & Tiedeman, Note 7).

This class of computer-assisted guidance systems has had its casualties, too. AUTOCOUN was one (Harris, 1974; Cooley & Hummel, 1969), which in light of the later NVGA guidelines was truly advanced for its time. The Computer-Assisted Career Exploration System (CACE), directed by Impelletteri (1969c) at Pennsylvania State University, was another loss (Harris, 1974). As one of the most promising and useful types of systems, however, the total number of direct inquiry systems with monitoring has actually increased by one since Harris and Tiedeman (Note 7) counted three in 1974.

Although the role of ECES nationally has diminished considerably (IBM has given it to the State of Michigan, and it is now in operation in one school district there (Harris & Tiedeman, Note 7).), CIVS remains fairly healthy. The System of Interactive Guidance and Information (SIGI), developed by Katz (1968) and his associates at the Educational Testing Service primarily for junior colleges, is growing, and much of the latest major system developed, DISCOVER (Harris-Bowlsbey, 1975), has been made operational in the last two years. A fifth system, the Army Officers Career Information and Planning System (OCIPS) (which is similar to DISCOVER), is in the laboratory stage at Teachers College, Columbia University, under Myers' direction (Super, 1978).

Although technically a direct inquiry system with system monitoring, DISCOVER is fundamentally different from most such systems and represents the state of the art of this class of system. Super (1978) categorizes it separately (along with the developing OCIPS) as a career development system in the scientific sense of the word "career," i.e., as a process, a sequence, of positions. Other systems utilize an occupational model, which deals only with single, unrelated career positions and events. Developed by Harris (later Harris-Bowlsbey by marriage) with assistance from the State of Illinois and IBM, DISCOVER is based solidly on a theory of career development as life stages. This shifts the emphasis from discrete decisions made at particular points in time to the underlying and continuous process of career development through which individuals define who they are and the kind of lives they lead (Watts, 1978).

In DISCOVER, students are not only aided in considering what steps and decisions led to their current decision, but are helped to see beyond the current decision as well.

DISCOVER helps students understand life stages, and particularly the tasks of their present exploratory stage of career development. It helps to coordinate assessment, readiness, exploration, crystallization, specification, and to execute implementation, and it teaches decision-making as a continuously needed skill (Super, 1978).

Taking many lessons from the development of CVIS, DISCOVER also contains a counselor and administrative support system to handle the administrative functions which have been previously described, thus increasing the likelihood of its acceptance. In addition, DISCOVER addresses a wider range of career guidance, having not only a subsystem directed toward the high school level, but also one for college and adult career guidance needs, thus making it attractive to a wider population. To aid in familiarization, DISCOVER includes an in-service training package for counselors and teachers.

Direct inquiry systems wth system and personal monitoring. Of extraordinary complexity are direct inquiry systems which monitor the use of the system in accordance with both the system's and the user's constructs. Harris and Tiedeman (Note 7) define such systems as having all the characteristics of direct inquiry systems with system monitoring plus instruction in deliberate career decision-making, the ability to allow the user to store information about himself or herself to use in later career decision-making, and the ability to permit the user to personalize and then use its original monitoring procedures to supervise his or her decision-making. In short, such a system accomodates not only monitoring of system use according to what the system designers thought was important, but allows the user to write his or her own monitoring criteria and have the computer evaluate his or her interaction with it in terms of those criteria as well (Tiedeman, 1969).

The Information System for Vocational Decisions (ISVD), developed by Tiedeman and his colleagues at Harvard, was the only example of a direct inquiry system with both system and personal monitoring that has ever been attempted. The system existed in prototype form in 1969 after three years of effort; an example of an extremely challenging project near the evolutionary beginning of computer-assisted counseling.

The ISVD was made more complex by the desire of its developers to provide career guidance to all, and to do so using natural language. The latter is recognized by linguists and computer experts as one of the most difficult problems facing computerization, and it still awaits substantial success and certainly widespread use. The former characteristic, to provide career guidance to all, requires an information base which includes all levels of education and training, military service, and all aspects of occupations (e.g. training required, usual duties, salary, demand, etc.) (Cooley & Hummel, 1969). To merely accumulate and store this information would be an awesome task from the standpoint of quantity, let alone from the standpoint of programming computers to use it effectively.

Despite the complex programming required to utilize the most adequate theoretical basis of all the American projects, to provide universal career guidance, and to use natural English, the ISVD directors accepted a funding timetable of only three years for a project that should have had at least double that period (Super, 1978). The result was a system which existed largely on paper, which had been only partly programmed, which had therefore been only partly debugged at the end of the three-year contract. The project was terminated without reaching completion (Super, 1978).

Whether the funding agency was short-sighted in not supporting another three years, or the developers were unrealistic in not setting reachable goals, or both, the result is the same: Work stopped on a system that would have been more advanced than any which exist even now (Super, 1978). Due largely to his efforts with ISVD, Tiedeman is today regarded as the chief futurist and forward thinker in the field of computer-assisted counseling (Harris & Tiedeman, Note 7).

Analysis of the Present Status of Computer-Assisted Guidance

The pressing need in school guidance programs for more and better guidance and information has been well established. The ability of computer-assisted guidance information systems to effectively and sensitively meet a major portion of this need, and to promote other improvements in school guidance practice as well, has also been established. Some obstacles to computer-assisted guidance have been analyzed and solutions, many known for years, have been re-examined and again proposed. Finally, the historical development of computer-assisted counseling, in its many permutations, has been considered in the hope of providing insight into the present status of computer-assisted guidance in the nation's schools.

These considerations provide the necessary background for the inevitable question regarding computer-assisted guidance: Given the needs already established and the availability of practical solutions, why is there presently such minimal use of computer-assisted guidance in schools today?

Perhaps an appropriate framework in which to consider this question is Tondow's (1967) notion of the push and pull of scientific and technological development. Often important questions are known, but there are few or no tools available with which to answer them. In this case, we are trying to _pull_ along developments. (The present quest in astrophysics to verify the wave nature of gravity, for example, is in precisely this stage.)

Then, however, the necessary tools and techniques are invented or developed, and for a long period of time they await utilization to their fullest capabilities. They are _pushing_ us to seek out new solutions and to express more creative approaches to existing problems. In education we are now in a push phase; we have tools and techniques that await their full utilization (Tondow, 1967). In fact, the technology available to us today is probably the least limiting factor we face. Within this framework, the earlier question can be rephrased: What are the things which our available tools and techniques are trying to push out of the way of fuller utilization? What is standing in the way?

Financial obstructions. Harris and Tiedeman (Note 7) attribute the precarious status of computer-assisted guidance primarily to financial problems:

> It should markedly chasten international computer buffs to realize that of the 25-30 computer-based guidance systems which underwent development in the United States, only five . . . predominantly remain in the field at this time. What have these hard financial lessons taught us in the States? (p. 6-7)

Harris and Tiedeman (Note 7) characterize the systems which survive as: (a) direct inquiry systems, (b) generally directed toward the secondary level, (c) cost feasible, (d) using standard terminal equipment, (e) specializing in retrieving, sorting, and synthesizing information for career decision-making (as opposed to doing much in the way of values clarification and decision-making instruction, although SIGI and DISCOVER now include these functions), and (f) often included in a package which supports counselor and administrative functions as well as guidance.

There is reason to believe that financial considerations comprise only one obstruction to computer-assisted guidance, however, and possibly not even the primary one. Some reasons for this doubt have been discussed previously, such as the existence of computers in many schools. Others include Menacker's (1975) observation that professionals have not yet met the existing demand if inferior systems survive. While many such systems have in fact not survived (as well as some quality ones), some remain. If schools and taxpayers are willing to support such inferior systems, then the obstruction is not one of dollars necessarily, but rather lies in the reasons for choosing an inferior system.

Also diminishing the financial argument is the vast improvement in the performance per dollar of computers during the last decade. If anything, this technological improvement exerts a bigger "push" toward fuller utilization, and will likely continue to do so.

Another factor operating against the primacy of cost in obstructing the widespread use of computer-assisted guidance is the legislative one. The federal government has demonstrated a significant interest in occcupational information systems, and has recently required their use in all states receiving aid under the revised Vocational Education Act of 1963 and the Comprehensive Employment and Training Act of 1973 (CETA) (Sawyer & Kemph, 1978). While these systems may not all be designed for use at the secondary level, and although the reasons for the apparent delay in developing such systems are not clear, the federal government has funded projects in eight states and has certainly demonstrated its support of computer-assisted guidance systems.

Thus while the expense involved in obtaining and maintaining computer hardware and software is certainly a limiting factor to the widespread use of computer-assisted guidance systems, it is not at all certain that cost is the primary obstacle to wider guidance system use at the present time.

Acceptance obstructions. However minimal its cost, no guidance innovation will ever be purchased by a school system without the backing of the guidance staff. Though counselor support is hardly sufficient to guarantee that funds will be made available to implement an innovation, it certainly is a necessity prior to purchase and implementation. Without the essential support of counselors, those individuals in a position to approve computer-assisted guidance information systems will have little inclination to do so (Myers, 1970). Counselor acceptance is unquestionably critical to the widespread use of computer-assisted guidance.

While counselor acceptance is necessary to the widespread use of computer-assisted guidance systems, ironically it may at the same time be a limiting condition to the quality and sophistication of such systems. Impelletteri (1969b) asserts that:

> The degree of counselor acceptance of a guidance support system is inversely related to the portion of the school's total guidance program which the support system has been designed to include. (p. 118)

Impelletteri's observation seems accurate due to the reasons previously established as inhibiting counselor acceptance: training, self-perception, unfamiliarity, orientation, and perceived threats to job control and security.

One of the reasons that GIS has enjoyed continued success, despite its inferior interactive, synthesizing, and instructive capabilities relative to other systems, is that it represents a lesser portion of the total guidance program than other, more sophisticated systems. As such, it is more acceptable to school counselors, as predicted by Impelletteri's equation. Lending further credence to this notion is the similarity of the British experience (Watts, 1978).

Finally, most school counselors have done little to become aware of the potential of computer-assisted guidance systems, and have shown little inclination toward improving their professional practice by translating the broad aims of their guidance programs into objectives that are operational and explicit (Cooley & Hummel, 1969; Harris, 1974; Loughary, 1970).

If this reasoning and description is accurate, then the current situation could be characterized as one in which little use is made of computer-assisted guidance systems largely due to the selfish reluctance of many school counselors to accept such systems, and that where such systems are accepted, they are often of lesser sophistication than they need be for the same reason. If this is the case, then it is made all the more unfortunate by the apparently increasing public acceptance of computer-assisted guidance (Harris, 1974), and by the well-documented acceptance of guidance systems by students.

System development obstructions. In subtle ways, system developers may have counterproductively helped to create this situation. Since system development usually occurs in a particularly innovative environment, developers often become absorbed in creating the "ideal" guidance support system for that environment. The application of a system thus developed can be extremely limited in less innovative climates. Similarly, a finely honed computer-assisted guidance system can only be used by counselors attuned to such razor sharpness--a small minority among school counselors. It is likely that only 15 to 20 percent of practicing guidance counselors would be willing to use even a cost-feasible computer-assisted guidance system (Impelletteri, 1969b).

Impelletteri (1969b) notes the dilemma that developers face in whether they should try to design and produce an "ideal" guidance system, or put more effort toward maximum implementation and use of the system that they do develop. In general, to the detriment of widespread use of computer-assisted guidance systems, the former option seems to have won out. The United States Office of Education (of the Department of Health, Education, and Welfare) has promoted this misdirection by putting much money into the research and development of computer-assisted guidance systems, and little into their application to and implementation in schools in general (Creative Concepts, 1970).

It is also possible that the quest for the "ideal" system led too many developers to promise too much too soon. Perhaps some of the present counselor reluctance to utilize computer-assisted counseling systems is merely a generalized reluctance on the part of school counselors to rebuild previously shattered hopes and expectations. Clearly this writer does not suggest that developers intentionally create inferior systems to maximize use. Yet to produce an automated guidance system, however magnificent, which is beyond the reach of most schools is certainly no help to the average guidance counselor (Godwin, 1969). Thus the probable extent of use of a system deserves serious consideration during its design and development stages. Many benefits, such as the gentle but effective introduction of computer-assisted guidance into schools, can come about through the implementation of lesser systems (Walz, 1970).

Many other hindrances to the use of computer-assisted guidance systems also relate most closely to system development. The local applicability (which may imply local modifiability) of computer-assisted guidance systems is an obvious necessity. Too comprehensive a system excludes the local uniqueness (Impelletteri, 1969b) which good information (and good guidance use of it) requires (Dworkin, 1970; Pierce, 1972; Sawyer & Kemph, 1978; Super, 1970). In addition, counselor-modifiable systems are likely to promote greater counselor involvement and higher counselor acceptance. Counselor innovation in such systems could become a new source of system enhancements, and users' groups could even be formed to share ideas (Godwin, 1969).

System developers have often been unable to distinguish between "tomorrow" and "someday." In some cases, they have underestimated the time necessary to develop a system in order to get financial support. The backlash from this tactic, that funders then get disenchanted with what is to them unexpectedly slow progress, may account for some of the scarcity of financial support for system development in the last five years (other than the limited federal aid to states) (Cooley & Hummel, 1969).

Similarly, the tendency for the rhetoric about the emerging systems to exceed their actual capabilities has been a problem in system development (Myers, 1970). So many influences impinge upon the successful widespread use of computer-assisted guidance systems that developers really cannot use the verb "will" with any assurance in describing their hopes. This fact appears to have stopped few of them, however, Tiedeman (1970) being a notable example. Walz and Rich (1967) made this point strongly in 1967, with an extraordinary amount of foresight:

> Perhaps one of the most important conclusions to be drawn from reviewing the outcomes and implications of information systems is that they may well _not be_ a significant force for change. Wherever we have used "will," we just as well could have inserted "can." We are more assured that the mechanics of information systems are workable than we are that individuals can make the necessary changes in attitudes and beliefs to use them. The emergence of information systems is undeniably a force for change in counselor education [and counseling and guidance in general]. Whether it results in changes or not will depend upon the professional response to that force. (p. 284)

Finally, from a more procedural standpoint, Cooley and Hummel (1969) attribute many of the shortfalls in past system development to research reports which have not been accompanied by (1) specific objectives for guidance, (2) identification of the necessary specific information, (3) definition of a set of procedures that schools might use to meet guidance objectives, (4) tests and evaluation of those procedures, (5) packaging of the results (tests, manuals, computer programs, etc.), and (6) dissemination of developed programs to the schools. Although Cooley and Hummel directed these comments primarily toward Project PLAN (Flanagan, 1962), which was more a planning and teaching system than a career guidance system, in large measure they apply to computer-assisted guidance systems of all types.

Summary and Future Outlook

It appears that Oettinger (1969) was correct when he claimed that schools are institutions ideally designed to resist change. It appears that present guidance practice is a cornerstone of this intransigence. The vicious cycle of poor performance in school guidance practice, and the unwillingness of guidance personnel to improve it despite the availability of at least partial solutions through computer-assisted information systems, leaves school guidance counselors open to question regarding their perception of, faithfulness to, and effectiveness in their primary role of outfitting young people for the future.

Despite the fact that financial considerations, imperfect system design and development, and inappropriate counselor training also place serious limitations on the widespread use of computer-assisted guidance, this writer remains cautiously optimistic about the future of computer-assisted guidance. While it is not likely that financial support will improve in the near future, or that counselor education will change rapidly, it should become more and more difficult for school counselors to ignore the continuing explosion in information complexity and still claim to be serving a useful purpose. Furthermore, there are enormous pressures building to increase the productivity of the American educational system, and the recent history of the United States renders us highly receptive to the notion of technological solutions to social problems (Myers, 1970). Loughary (1970) and Tondow (1967) claim that access to a data processing system is already a precondition for coherent intellectual work involving many people. Increases in technological capability per dollar are also likely to continue, bringing ever greater pressure to utilize such advances in the solution of problems.

Factors exist, however, which prohibit unrestrained optimism. Counselors are trained professionals, and they often reflect the emphases and biases of their training. To this writer's knowledge, little change is occurring in counselor training programs toward more specifically preparing school counselors for the many non-clinical tasks which they will face. It is also of great concern that little of the professional interest in computer-assisted guidance which existed a decade ago still exists. Perhaps worse, there is little professional leadership in the area at this time, and apparently few maturing professionals are seeking expertise in the field. Perhaps the counseling profession remains disappointed and exhausted from the rhetoric and overexpectations of the early 1970's.

In conclusion, there should be very little question that computers in education are here to stay; the information needs of education require computer support. Counselors need to become more involved in computer-assisted guidance, if only to avoid the alternatives. As long as the initiative (research through implementation) lies primarily with business whose sole motive is profit, the users of guidance technology are more likely to be short-changed (Dworkin, 1970). External and commercial information handling systems also bring a greater risk of impersonality, invasion of privacy, and inapplicability simply because they are less sensitive to local issues and needs, and are less under local control. Another alternative, that of doing nothing, has already been shown to be an extremely irresponsible and unsatisfactory option.

This writer hopes that school counselors will recognize rather than continue to ignore the increasing need for effective, instructive information handling in guidance, and will further recognize that getting a good information system according to one's personal standards requires one's personal involvement. Most importantly, this writer hopes that school counselors will recognize and more fully utilize their unique role in an age of increasing technological impact on daily life, and acknowledge the burden that they have chosen:

> It is of utmost importance that those of us who have assumed the responsibility and privilege of helping others with their personal problems and aspirations become well enough informed regarding man-machine systems to participate intelligently and sensitively in their development. It is only in this way that we can assure that automated systems contribute to, rather than inhibit, the freedom of the individual. (Loughary et al., 1970, p. 82)

CHAPTER IV

A COMPUTER PROGRAM TO ASSIST IN THE COLLEGE SELECTON PROCESS

One of the primary goals of this thesis is the development of a minimal direct inquiry guidance information system to assist high school students in the process of selecting a college. This system, similar to a part of the Guidance Information System (GIS), provides students with information in a way that helps to narrow down the number of alternatives available to them. The potential for more effective use of counselor time and the resulting improvement in guidance practice, as detailed in the last chapter, is a corollary goal. As a region of particular interest, proximity, and quite possibly need, it was decided to develop a small, computer-assisted college information system appropriate to the needs and capabilities of New Hampshire. This follows the example of many other computer-assisted guidance systems which offer information primarily for and about one state (Lambert, 1977; MacKinlay, 1974; Cassel, Note 13).

Project Rationale

Such a project raises a number of questions about the wisdom and nature of this undertaking. Perhaps the most important consideration is that of duplication of effort. Why should the writer engage in something that has already been done before, and has been done more extensively as well? There is indeed no question that many other systems have been developed over the last decade which are much wider in scope and which possess much more complex features than this one. However, there remain a number of reasons in support of this project.

First, as far as actual use of computer-assisted guidance in the State of New Hampshire is concerned, all of the previous projects have failed. There is very little computer-assisted guidance in the state, and most of that which does exist is primarily counselor-supportive (e.g., report generating, attendance keeping, and schedule changing). Very few directly student-accessible guidance systems of any sort are currently in operation in New Hampshire. Thus after a decade of little usage of computer-assisted guidance systems in New Hampshire schools, another attempt of a different nature is justified.

Secondly, this project specifically seeks to correct some of the shortcomings in guidance and in computer-assistance to guidance which the previous chapters have illustrated. Instead of ignoring past developments, this project is designed with some of their failings in mind. As to the specific nature of this system, it purposely addresses only the college selection process. This recognizes the fact that giving college information to students is one of the counselor's most time-consuming responsibilities, and adheres to Impelletteri's (1969b) guidelines relating higher counselor acceptance to less inclusive systems. This system is also designed to promote a great amount of counselor involvement in the nature and dynamics of system use, as well as to be easily locally modifiable. These two characteristics are largely accomplished by allowing each guidance office to determine the contents of the system data file for its own local use.

The problems inherent in this arrangement are recognized, particularly the potential for retaining counselor bias and the necessarily limited amount of information which can be included in a data file so constructed. However, this procedure also requires significant counselor involvement, it automatically makes the system quite sensitive to local needs, and it allows data file sizes to be appropriate to local hardware capabilities.

A further problem, that of the responsibility for updating the local data file to keep it current, has no easy solution. However, since the data file is designed to be easily constructed from one of the common college information manuals (e.g., the College Entrance Examination Board's College Handbook), updating can be fairly simply accomplished by referring to newer editions of such source books and making only the necessary changes. The updating process is designed to be uncomplicated, so student assistance with this task may be possible.

This system thus specifically addresses and promotes two of the most critical variables affecting the widespread use of computer-assisted guidance systems: counselor involvement and local applicabilitiy (Loughary, 1967a; Hallworth et al., 1970). Through a third characteristic, that of variable data file sizes, this system may serve despite its limited sophistication to increase the number of guidance offices utilizing some form of computer-assisted guidance; schools whose participation may otherwise have been precluded due to the absence of enough computer storage space for a more sophisticated system's data file(s). Modern microcomputers are now so inexpensive, for example, that guidance software which could run on these machines might find quick acceptance and dramatically increase the number of schools using some form of computer-assisted guidance.

Through the use of this purposely small and limited system, practicing guidance counselors may also get enough of a taste of the benefits of computer-assisted guidance to seek administrative and municipal approval of larger, more sophisticated systems. This approach constitutes the first steps of what Walz (1970) has called the integrative approach to utilizing technology in guidance: a gradual approach to the introduction of computer-assisted guidance which respects the interrelationships between people and practices within a community. Given the dependence of widespread guidance system use on counselor and community acceptance, this approach seems more likely to succeed as well.

Finally, by disseminating this system free of charge, it will be easier for willing guidance counselors to employ computer-assisted guidance in their schools. Conversely, it is hoped that reluctant counselors will find a small, inexpensive, non-threatening guidance information system harder to ignore than large, esoteric, and expensive systems.

The differences between this and some past approaches to computer-assisted guidance technology amount to disparities among developers over the definition of a "good" system. Should a computer-assisted guidance system be judged on what it is capable of doing, or on how much use is made of it? While these two criteria are not necessarily mutually exclusive, the discrepancy between them challenges the apparently prevailing attitude that "bigger is better," and, by implication, that anything less than the state of the art is mere duplication of effort. Without wishing to deny other projects the right to specify their own standards, this project seeks maximum useability; a criterion which other systems have clearly failed to meet.

Indeed, this writer concurs with Godwin's (1969) earlier remarks which assert that an ideal but little-used system provides little contribution to guidance practice, and also with Impelletteri's (1969b) concerns about the dangers in all-or-nothing approaches to technology in guidance. In short, it would seem that many widely used practices, technologies, and materials are not so much the result of breakthroughs in new technology or new conceptualizations, but rather the products of a long series of revisions, adaptations, and improvements which are specifically designed to promote use and which contribute little or nothing to the actual state of the art. This project is designed to be precisely such a revision or adaptation of past approaches to computer assistance in guidance.

Project Objectives

The primary goals of this system are to provide more and better college information to students than the overtaxed counselor can provide, and thus to improve the guidance counselor's level of performance in his or her other areas of responsibility. Like all systems utilizing computer technology, another objective of this system is to organize and store information in a form which maximizes the user's ability to rapidly retrieve information which is relevant to his or her specific needs (Walz & Rich, 1967). The ability to easily update stored information is also an objective.

Since this system is a direct inquiry system (without monitoring), it can capably serve students of varying ability and experience, promote their awareness of the cause-and-effect nature of specifying choice criteria, broaden their knowledge of personal alternatives, and promote an inquiry approach to their own career development. The students' decision-making abilities should also benefit from individualized experiences on the computer, particulary if the counselor employs the previously described values/information/prediction paradigm.

Student use of the system should also indirectly broaden the counselor's outlook on colleges. Combined with enhanced student readiness, this should in turn lead to a higher level of counselor-student interaction. Ideally, with college-bound students getting some assistance from the computer, the counselor will have a greater opportunity to undertake the perhaps more difficult task of counseling non-college-students with respect to their post-high school plans as well. Finally, it is hoped that the increase in parent-student communication which is often observed following student use of a computer-assisted guidance system

(Bohn, 1970; MacKinlay, 1974) will occur here as well.

The less common objectives and procedures of this development project include promoting the widespread use of the system by freely disseminating its materials. Wider use should also be encouraged by the intentionally small size of the system, which makes it useable despite limited hardware capability. The objective of immediate local applicability will be largely accomplished through local construction of the system's data file. In addition, local adaptability may be fostered by the system's flexibility, ease of use, and complete documentation. Indeed, one goal of this system would be to provide a foundation and incentive for locally developed system enhancements; the inclusion of local occupational opportunities or scholarship availability, for example.

It is also an objective of this system to maximally involve the school counselor by including him or her in the construction and maintenance of the system's data file and in the design and implementation of local system enhancements. The system is further intended to serve as an introduction to computer-assisted guidance, promoting the eventual use of more sophisticated systems. It should be made particularly clear that this system is designed to function as an extension of the guidance counselor rather than as a replacement for him or her (Impelletteri, 1969c).

Relative to Harris' and Tiedeman's (Note 7) determinants of system survival, this system is a direct inquiry system, is directed toward the secondary school population, uses standard terminal equipment, and specializes in information retrieval, sorting, and synthesis for one aspect of career decision-making. This system is inexpensive, although it is not included in a counselor-administrative support system. According to Harris' and Tiedeman's (Note 7) criteria, this system should thus stand a good chance of survival.

Survey of Educational Computer Capability in New Hampshire

In order to more precisely tailor this system to fit the potential for its use in New Hampshire secondary schools, an accurate picture of the state's educational computing capability had to be obtained. However, after conferring with the Mathematics Consultant for the New Hampshire Department of Education (Prevost, Note 2), and with knowledgeable computer science instructors in the state, it was found that while many individuals were aware of the computer capability of schools in their surrounding localities, no one had a statewide overview of educational computing. Since this information was unobtainable elsewhere, a survey of New Hampshire secondary schools was undertaken to identify the state's educational computing capability.

Survey procedure. A telephone survey of 80 New Hampshire secondary schools, both public and private, was conducted in June, 1978. Each school was asked if it had an in-house computer, access to an external computer, or if it anticipated having either soon. If so, information was requested regarding the machine's manufacturer, its model number, its core memory space, its capacity to handle data files, its uses in the school (e.g. educational, administrative, and/or guidance), programming languages used, and how long the school had been so equipped. Whenever possible, contact was made with the school's guidance staff.

Survey results. Of the 80 schools contacted, 17.5% had sufficient computer capability to probably utilize a significant computer-assisted college information system, and another 17.5% had enough computer capability to possibly use such a system. The use of such a system was found to be doubtful for 12.5% of the schools with some form of computer capability, and 52.5% of the schools had no present computer capability at all.

The programming language BASIC was found to be used by 81% of the schools which had some type of computer capability. Only three schools (3.75%) indicated any prior, present, or reasonable expectations for any future use of any commercially available computer-assisted guidance information system. In each of these schools, the Guidance

Information System (GIS) was the particular system mentioned. While a few counselors were found to be using computers in some aspect of their work (e.g., scheduling) and some were knowledgeable enough about their school's computer to be of assistance, some counselors did not even know if their school had a computer and many wondered why they would be contacted with a request for information about possible guidance use of computers in their schools. Apparently they saw themselves as having no relation to the computer, and had little awareness of its potential usefulness in guidance.

Discussion of survey results. The survey results indicated that there is considerably more computer capability in New Hampshire secondary schools than there is guidance use of that capability. This corroborates the conclusion of the last chapter that hardware cost is not necessarily the primary obstacle to computer-assisted guidance.

The preponderance of schools utilizing the BASIC programming language indicated that BASIC should be used in any computer-assisted guidance information system which hopes to maximize its potential for widespread use in the state. The general use and awareness of computers by counselors was supportive of assertions made in earlier chapters of this thesis regarding counselor orientation and competence.

An interesting observation resulting from this survey was the scarcity of educational computing facilities in any form in many of New Hampshire's largest metropolitan areas. Conversely, some of the most significant and sophisticated computer use in the state occurs in some of the smaller regional and rural schools. Apparently, a school's enrollment has little relation to the presence of computer facilities in the school. The reasons behind these perhaps surprising findings are presently unclear, indiciating the need for research into the factors which determine the availability of computers in secondary schools.

Finally, the expressed aspirations of many of the schools' personnel, and the young age of several educational computer installations (36% of the most capable school computers have been installed less than two years), indicated that the number of secondary schools in New Hampshire which possess or have access to computer facilities is increasing and likely to continue to do so.

Factors Important in College Choice

Before factors affecting the college selection process could be built into this computer-assisted college information system, they first had to be determined. Thus, another significant set of background information had to be obtained regarding the relative import of a number of factors which possibly influence the process of selecting a college. Fortunately in this instance a fairly large body of literature existed concerning factors influential in college selection.

Since much research had already been done regarding college choice factors, a concensus approach was used to isolate important factors. Factors utilized by other computer-assisted guidance systems were particularly welcome ("Computer Offers," 1970; Creative Concepts, 1970; MacKinlay, 1974; Minor, 1970; Sawyer & Kemph, 1978; "Selecting a College," 1973; "Terminal Careers," 1974; Cassel, Note 13). However, other research in the field unrelated to computer-assisted guidance was also considered (Brownstein, 1964; Dole & Digman, 1967; Gelatt et al., 1973; Hansen, 1965; Hood, 1968; McConn, 1937; Morrison, 1968; Norris et al., 1966; Roth, 1976; Siddoway, 1967; Walton & Mathis, 1967).

College characteristics listed as important choice factors by two thirds or more of the above sources included a college's geographical location, cost, and enrollment; the type of community in which the college is located (e.g., rural, suburban, or urban); and the major courses of study which it offers. Factors considered important by at least one third of these sources were: information about the college's admission characteristics and practices (e.g., prestige, selectivity, admission requirements, tests required, and deadlines); characteristics of the college's student body (e.g., coed or single sex and diversity of ability); the type of college (e.g., two-year, four-year, or other); special services or programs offered (e.g., overseas study); institutional control (i.e., public or private); academic climate; campus life and activities; religious attributes or affiliation; availability of financial aid; and athletic programs offered. Factors considered important by less than one third of the sources included campus housing arrangements, degrees offered by the college, characteristics of its faculty, its accrediting institutions, its calendar plan, the college's cultural environment, the college's ties to one's family and friends, and the past success of its graduates.

Keeping in mind the size objective for this computer-assisted guidance project, it was decided to include all of the factors named by one third or more of the consulted sources with three exceptions. The type of college (e.g., two-year, four-year, or other) was not included as it was felt that a separate but similar data file of two-year colleges and other post-high school training opportunities could be easily and independently developed and later accomodated by the system. While some measures of academic climate and campus life and activities could certainly be developed and computerized for a larger system (as has in fact been done), the effort to maintain the small size of this system precluded incorporating these two factors.

It should be noted that the remaining twelve factors hardly contain enough information in enough detail on which to solely base the choice of a college. However, this system is not designed to assist in the selection and execution stages of college decision-making. Rather it is intended to be an aid to exploration through which a student may be able to identify a college which is worthy of closer examination. Once a college has been identified, the student can learn more about it through college reference manuals, the college's catalog, or perhaps a personal visit to the campus itself.

The CHOOSE College Selection Package

The CHOOSE College Selection Package (CCSP) was developed according to the goals earlier defined and includes the twelve factors isolated above. The package is made up of two distinct computer programs, MAINT and CHOOSE. MAINT is the program used by the counselor to build and maintain a data file of college information. The CHOOSE program is used by the student to retrieve information about colleges from this data file. Both programs operate through the use of "menus" or lists of actions which the user may select.

The MAINT program offers the counselor seven possible actions: (1) Initialize and build the college data file, (2) Add college(s) to the data file, (3) Delete a college from the data file, (4) Update the information stored for a given college, (5) List the colleges stored on the file, (6) List all the college characteristics stored by the CHOOSE Package, and (7) Dump the contents of the data file. The fifth option provides college lists, ordered either alphabetically or by college number, to serve as reference materials for student and/or counselor access to individual colleges' information. The sixth option is also useful for reference purposes since it shows the student what information he or she can request, and it can be used by the counselor as a coding sheet for inputting college information to the data file. The seventh option simply prints the contents of the college data file, an option most useful for checking stored data or debugging program enhancements.

Once the college data file has been built, the CHOOSE program may be used by students to specify characteristics which they would like their colleges to have. CHOOSE offers the user six possible actions: (1) Add a college specification, (2) Delete the last specification, (3) List the current specifications, (4) List the colleges that meet the current specifications, (5) List all the information stored for a given college, and (6) Restart the specification process. The student can use CHOOSE in two ways; to narrow down a list of qualifying colleges by successively adding specifications, or to directly access one college's information through the use of the fifth option. The narrowing process used by CHOOSE is a simple one: With the addition of a new specification, CHOOSE merely takes an appropriate subset of the colleges which formerly qualified, and considers that subset to be the new qualifying set.

Both MAINT and CHOOSE were developed to be as easy and as foolproof to use as possible, and they are small enough to run on most micro-computers. Sufficient storage space for the college data file can be a limiting condition, but the CCSP data file is adjustable to meet local capabilities. The programs were designed to provide a great deal of flexibility. Counselors may easily change some of the characteristics currently stored into ones that they might prefer, and the entire structure of the programs is easily adaptable to other data files (e.g., information for two-year colleges, vocational/technical colleges, and perhaps even occupations) merely by changing the characteristics stored by the system and building an appropriate data file. The CCSP programs are heavily documented internally to facilitate local program modification when and where desired.

The CHOOSE College Selection Package is described in detail in three manuals: the "CHOOSE System Manager's Guide", the "CHOOSE Counselor's Guide", and the "CHOOSE Student's Guide." These three manuals, as well as the source code listings for the MAINT and CHOOSE programs, make up the CHOOSE College Selection Package Distribution Packet, which may be found in the Appendix.

CHAPTER V

CONCLUSIONS, IMPLICATIONS, AND EXPECTATIONS

The Future of School Guidance

Research into the effectiveness of present school guidance practice indicates that many school counselors may have set aside or forgotten their true purpose: to help prepare young people to capably face their future. The difficulty inherent in this task, that is, that the world the counselor knows is not the same world that his or her students will face, seems scarcely recognized despite the fact that this realization should be the cornerstone for all guidance practice.

Rather than a steady eye on the future, many counselors seem to have a steady eye on the past and present. Guidance counselors, like all humans, are remarkably capable of remaining blind to things that they do not wish to see, and the accelerating rate of change in the world as we know it certainly presents a disconcerting element. Given that the present is hard enough to handle, how can anyone reasonably be expected to deal successfully with the future?

The vagaries of the future may indeed make "successful guidance" too much too expect: Many counselor theorists have even described the job as impossible. What we certainly can expect, however, is vigorous effort toward that end. Unfortunately, research shows that incompetence, misdirection, inertia, inappropriate responsibilities, and inadequate training plague and possibly dominate school guidance practice. Thus even meaningful, well-directed effort toward preparing students for the future appears to be seriously lacking.

This failing is evidenced by the consistently low ratings which high school graduates give counselors regarding how much aid they received in making their post-high school plans, and how effective that aid actually turned out to be. However valuable guidance counselors may seem to the school administration, the community, or the state, the consumers of guidance services are far from satisfied.

This situation is a product, however; the result of a number of separate failings which have combined to create it. Many factors are to blame for this state of affairs, and many of them have been considered individually in previous chapters of this thesis. One which particularly stands out, however, is the apparent inability of guidance counselors to adapt to the onrushing future themselves. In particular, counselors seem especially unwilling or unable to take advantage of developments which could make their tasks more manageable and could aid in directing guidance efforts toward developing the sensitivities and skills which students will need in their later lives. The slow progress of the use of technology in guidance is a prime example of this unwillingness. The American School Counselor Association (1964) itself recognizes both initiative in finding new ways to carry out counseling duties and making use of available data processing equipment as professional responsibilities of the school counselor, but it also acknowledges that these may be more characteristic of what should be rather than what actually is.

Perhaps the counselor prefers to see himself or herself as a therapist and so chooses to remain ignorant of guidance technology. Perhaps he or she simply does not have the time available to get meaningfully involved in the use of computers. Such arguments, however, are seriously flawed. In isolating himself or herself from computers, the counselor grows less aware of the very world for which he or she is trying to ready his or her student clients. In addition, the counselor who spends a great deal of time making class lists, monitoring attendance, and analyzing test scores can hardly claim to be primarily a therapist. Finally, the computer is a time saving device. After an initial investment of time to learn to use available software or to develop programs with the help of computer staff members (or even students), more of the counselor's time could be devoted to actual counseling and guidance instead of busy work. In these times of rapidly accelerating increases in knowledge and information, to bury one's head in the sand relative to computing is to help defeat one's purpose as a counselor.

Further contributing to poor guidance practice is the apparent unwillingness of counselors to organize for effectiveness, to specify and operationalize their objectives, and to otherwise approach counseling as a "technology of helping." Similarly, the apparent reluctance of counselors to develop evaluation measures for their performance is a shortcoming which serves to perpetuate whatever practices currently exist. Technological applications to guidance are generally rigorously evaluated for effectiveness, improved on the basis of the evaluation results, and often resubmitted to evaluation. The same process of refinement and improvement through evaluation of effectiveness rarely seems to occur within school guidance practice itself.

It is possible that school guidance practice is approaching a critical mass. Impinging upon the profession from one side is the explosion in the amount and complexity of information which Tondow (Note 3) has skillfully described, and a "push" toward effectiveness brought on by underutilizied technology (Tondow, 1967). Public demands to increase the effectiveness of education relative to its cost also bring pressure upon the situation. On the other side is the inability of school counselors to practice effective guidance due to training, temperament, time-consuming extraneous duties, and a reluctance to depart from the status quo.

The experience of others indicates that it is unwise to make specific, dated predictions, e.g., for five or ten years hence. Negative predictions which do not come true may lead critics to dismiss the entire situation as having been fatalistically overblown. Similarly, positive predictions, e.g., of future technological developments or the widespread uses of technology, which do not eventuate may result in unmet expectations and loss of credibility. Besides, human memory seems to warp time such that a point in the future seems much further away than an equally distant point in the past. This distortion makes it easier to expect greater progress in the years ahead than in those just passed.

While this writer will thus not offer a specific, dated prediction, it does seems clear that the critical mass of poor school guidance practice is worsening, that it will not go away without serious effort, and that counselor inattention to this problem actively impairs the cause of effective guidance. Despite the willingness of counselors and perhaps communities to preserve the status quo, if the present course is maintained the day may soon come when the value of school guidance as performed will no longer economically justify its existence.

Widespread counselor involvement with computerized information systems could be a major factor in changing the present direction and averting such a scenario. The purpose of this thesis, in examining the issues surrounding computer applications to guidance, offering suggestions for positive improvement to guidance practice, and developing a small, introductory computer-assisted college information system, is to help change the present direction and to contribute to what Impelletteri (1969b) has described as the key to the future of school guidance: Counselors capably developing their own guidance support systems to suit their own particular needs.

Implications for Counselor Education

Some of the weakness in present school guidance practice can be attributed to the training of counselors. Counselor education is often clinically biased and not entirely suitable for those individuals preparing to become school counselors. The Statement of Policy for Secondary School Counselors by the American School Counselor Association (1964) reflects this partiality. Though much of the ASCA's professional rationale for school counseling is based upon the right and freedom of students to make intelligent decisions about their lives and their corollary need for assistance in doing so, neither decision-making itself nor the use of information in decision-making receives mention in the core study recommended by the ASCA for the professional preparation of school counselors. Study of vocational development is included but not emphasized, and Burck (1975) has noted the consistently low status of career counseling in counselor training programs despite its obviously high priority in a school setting.

Conceivably, the specific preparation of school counselors is a burden that many counselor training programs are reluctant to shoulder. If, as earlier stated, it is the goal of school guidance to prepare young people for the future, then it must follow that counselor education programs prepare the preparers of the young person's future: an enormous burden indeed. Even with good intentions, at least two factors work together to help foster inadequate training for school counselors. As preparers of preparers, counselor educators are twice removed from "the future," which makes it doubly difficult for them to perceive, and hence teach toward, counselor preparation appropriate to that distant future. This separation also removes the immediacy of the need for specific preparation of school counselors. Counselor educators can thus feel more free (and instruct more clinically) since the actual battle front is well over the next horizon.

To be sure, counselor educators do not have an easy task. Their programs provide training for all sorts of counselors, not just those who intend to enter school guidance practice. Nevertheless, many counseling students do enter school practice, and a counselor education program has an obligation to prepare its students for situations which they are likely to encounter.

Due to their overly clinical emphasis, many training programs overlook such important school issues as the guidance counselor's relationship to the school administration, techniques to handle other duties and still maximize counseling time, and ways to deal with faculty members regarding guidance concerns. Perhaps most importantly, both career counseling and personal testing and evaluation are often omitted or glossed over lightly. While counselor training programs certainly have neither the money nor the manpower to offer separate curriculums for different counseling specialties, it would seem possible for such programs to occasionally offer specialized courses for those students interested in a given counseling specialty.

Tiedeman (1967) has considered the need for revision in counselor education in great detail, and has made further suggestions for improvement. These include incorporating decision-making into the language and theories of guidance and counseling, reinforcing the profession's responsibility to exclude inept practitioners, preparing prospective counselors to deal with administratively oriented supervisors who share few of their counseling concerns, and teaching more about the dimensions of college decisions and student choices. Commenting specifically on computer-assisted guidance, Tiedeman (1967) puts the burden squarely upon counselor training programs. School counselor educators in particular need to learn how to use computer-based aids, since they have to transfer this ability to school counselors-to-be. School counselor educators must then teach their students how to transfer the same ability to high school pupils, whereupon the pupils' needs (and thus guidance's goals) can begin to be met (Tiedeman, 1967).

Tiedeman (1967) sweepingly summarizes the need for improvement in school counselor education:

> I think counselor education must reexamine its own structures, its functions, its purposes, its goals, its relationships, and its practices. It must improve coordination of all these things . . . to help counselor educators accomodate needed changes. I fervently hope that [we can bring about] the realization that change in counselor education was due yesterday, not tomorrow. (p. 142)

Implications for Research

An immense amount of research and development has gone into the "computer-assisted" half of the phrase "computer-assisted guidance and counseling." For fifteen years computer systems to aid school counselors have been designed and constructed in great quantity and with incredible variety. The nature, usefuleness, effectiveness, and implications of these systems have been extensively if not exhaustively researched. The same cannot be said about the second half of the phrase: "guidance and counseling." Despite the long availability of computer assistance and an exponentially increasing need for efficient information handling, computer-assisted guidance in the high schools of the nation remains virtually non-existent from a practical standpoint.

Some research questions remain regarding information and the use of computer-assisted guidance information systems. The issue of the effectiveness of computer-based systems with disadvantaged students needs clarification, for example. Other more theoretical issues also require study. These include determining the types and quantities of information students want and need to make intelligent career plans, identifying the factors which contribute most to individual satisfaction with educational and occupational choices, observing student career planning behavior and the effects of improved information upon that behavior, and determining the relative impact of various information delivery media (Krull, 1973).

These questions, however, are all issues of optimization. We have something that works well; now how can we make it work slightly better? They are small matters compared to the original "Can it be done?" and "Will it work?" types of questions. The existing research is hardly comparable on the "guidance and counseling" side of the coin. Here the question is not one of optimization but one of initialization. Until school counselors in general start using computer-assisted guidance support systems, we cannot even begin to think about the secondary issues of optimization.

Past computer-assisted guidance research and development could be likened to a process of elimination among the elements obstructing the availability and use of good information by students in making career decisions. Originally as in the business world, the sheer quantity of information was the primary problem, but through business' efforts computers were developed and made available. The next concern was whether computers could be put to meaningful use in guidance and counseling. Systems were developed as early as 1966 which proved that computers could contribute significantly to guidance practice. Then the question of the effectiveness of computer-assisted guidance systems arose and was answered affirmatively. Even the last reasonable obstacle of affordability was eliminated as computer costs declined dramatically and many schools and school districts purchased data processing systems.

The only major obstacle left is the reluctance of the average school guidance counselor to using computer-based aids. This is where the greatest remaining research needs lie. In part, such research should take the form of direct comparisons of the effects and effectiveness of various guidance information delivery systems; the most important one being the comparison between human and computerized delivery systems. Perhaps the results of a head-to-head competition between human and computerized systems would convince some reluctant counselors that they can confidently leave information giving to computers and get on with the more pressing human needs of school guidance practice.

Much research needs to be directed toward the counseling profession itself. Why has there been so little emphasis on career development in counselor education programs? Why does the vocational counselor face diminished prestige within his or her profession? How can the school counseling profession improve itself; cull inept candidates or at least direct them to their areas of strength? What specific preparation is necessary for counseling in a school environment? What are the issues at the root of these common problems? Why has so little attention been paid to these and similar issues in the past?

A primary goal of all counseling is the preservation and promotion of humanness in an increasingly inhumane world. Without professional standards, direction, and most importantly results, counselors can easily caricature themselves into a self-defeating and counterproductive posture that is detrimental to the profession as a whole. Thus perhaps the most critical research remaining is that which will provide the school guidance profession with definition and direction in counselor roles and functions, goals and operational objectives, analysis and evaluation techniques and measures, and accountability based on outcomes. Research of this type will help counseling become more of a "technology of helping."

Conclusion

Research indicates that there is trouble in school guidance practice as it exists today. School counselors have been shown to be inadequately prepared for the specific demands of school guidance practice, to be burdened with extraneous yet absorbing duties, and to be slow to recognize and take advantage of technological developments to improve their professional performance. For these and other reasons, school guidance practice has been accurately described as substantially ineffective.

The factors that have contributed to creating this situation are in many cases worsening. The nation's emotional and financial support for public education appears to be on the decline, and cries for professional competency examinations are not uncommon. The present economic situation requires that both parents work in more and more families, thus increasing the need for guidance, instruction, information, and personal counseling from alternate sources outside the home. Counselor education programs seem to be slow in addressing many present and future needs in school guidance practice. Finally, the quantity and complexity of information continues to accelerate.

Concerning the specific issue of information, computers have spread throughout our society due to a single, simple reason--they fulfill a vital need to the society. That need is the storing and efficient processing of large quantities of information. The guidance profession possesses the same information handling needs as society at large, yet school counselors have been extraordinarily reluctant to utilize computers in the informational aspects of their work. Something is seriously wrong in the profession if counselors, whose responsibility it is to prepare students to cope with the future, themselves remain ensconced far behind the rest of society. How are school counselors to prepare students for the future when their own handling of the present is so inadequate?

The conflict between counselor reluctance to adapt to the demands of a rapidly changing world and the onrushing future itself has created such stresses that something has to give. There are at least two possible outcomes. One interpretation is that we are witnessing the evolutionary decline of school guidance practice. Ineffective guidance is obsolete guidance. If the fittest survive, then current school guidance practice is doomed to extinction. The apparent inability of present school guidance to meet its goals indicates that this outcome might even be for the better.

An alternate viewpoint is that school guidance practice is merely suffering from inappropriate training, lack of direction and accountability, and other resolvable difficulties. Because the human needs of today's students are very prevalent and very pressing, one hopes that this alternative is a more accurate portrayal of the current state of school guidance. If so, then we are effectively saying that school guidance practice itself needs guidance. It needs to know clearly why it exists, what its responsibilities are, precisely how to go about meeting them, and how to know when they have done so. In short, it needs to have the proper professional training, direction, and accountability that a reconceptualization of counseling as a technology of helping could provide.

Fortunately many aspects of school guidance lend it toward such a reconceptualization more readily than some areas within the counseling profession (ASCA, 1964). Since school guidance deals exclusively with one age group, for example, its activities and problems are relatively predictable in a global way. The commonality of the client environment contributes similarly to this predictability. Thus a reconceptualization of school guidance as a technology of helping should be much easier to develop than one for counseling in general.

A central axiom of such a reconceptualization is that school guidance personnel would utilize any technique or technology which could enhance their ability to function effectively. The current availability of a wide range of computer-assisted guidance support systems makes it particularly easy to bring about this aspect of the suggested reconceptualization of guidance. Computer-assisted guidance information systems have a great deal to contribute to guidance. As part of a restructuring of school guidance as a technology of helping, let us begin to bring such systems into widespread use.

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APPENDIX

CHOOSE COLLEGE SELECTION PACKAGE

Distribution Packet

CHOOSE COLLEGE SELECTION PACKAGE

CHOOSE System Manager's Guide

by

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Introduction and Overview

The CHOOSE College Selection Package is a computer-based guidance tool which aids high school students in isolating colleges that are appropriate to their needs. By successively specifying characteristics of his or her ideal college, the student reduces the number of qualifying colleges to a manageable number. The cause and effect nature of his or her decisions is clearly visible with the addition of each specification. After identifying an interesting college, the student can obtain all information stored about that college. Having obtained this information on his or her own, the student can then return to the counselor for assistance in optimizing the use of this information in college decision-making.

The CHOOSE College Selection Package is made up of two programs, CHOOSE.BAS and MAINT.BAS. CHOOSE.BAS is the program which the student runs in order to specify desired college characteristics and to receive information about qualifying colleges. MAINT.BAS builds and maintains the COLLEG.FIL data file from which CHOOSE.BAS draws its information. By having the guidance counselor build the college data file with MAINT.BAS, it is hoped that stored information will be more appropriate to local needs, more readily and easily updated, and that the counselor will be more personally involved with the increasingly vital application of computers in dispensing accurate guidance information.

Both CHOOSE.BAS and MAINT.BAS are written in BASIC-PLUS. They were developed on a Digital PDP11/34 computer operating under RSTS/E V6C, and should run on any RSTS/E system without modification. With modifications for file handling, they should be runnable on any sufficiently large BASIC system with IF-THEN-ELSE capability. As packaged, CHOOSE.BAS requires 14k of core memory and MAINT.BAS needs 16k, although both programs could be condensed significantly. Similarly, both programs are written in BASIC-PLUS's EXTEND mode so as to allow long, self-explanatory variable names, but could easily be modified to run in NO EXTEND mode.

Program and File Descriptions

The COLLEG.FIL data file is a virtual array consisting of a two-byte integer representing the number of colleges stored in the file, a two-byte integer serving as a switch for the sort status of the file (sorted or unsorted), and an integer array containing college file positions for alphabetical ordering; followed finally by the individual colleges' information. A college's data is stored in 230 bytes of a 256-byte string, which is divided into subfields as shown on the enclosed Record Description Tables. The BASIC-PLUS virtual file structure requires that string lengths be in powers of two, so 256 bytes is the necessary length. The remaining 26 unused bytes could be used for modification or expansion of the system by interested individuals.

The MAINT.BAS program is menu driven, and contains several options for interaction with the COLLEG.FIL data file:

Build the file. Before building the COLLEG.FIL data file, its arrays must be zeroed. MAINT.BAS double checks that such is the real intent of the user before going ahead with the zeroing process in order to avoid accidental file destruction. In installations where security is a problem, a password routine at this point might be advisable. Building the COLLEG.FIL itself is accomplished by successively concatenating requested information about a college into one large string. This process continues for as many colleges as the builder would like to input. Byte position in the college string is the method by which the stored information is later accessed.

Add a college. Build routines are used to input and concatenate a new college's information. The resulting string takes the next sequentially available place in the file.

Delete a college. A college can be deleted from the file by specifying its college number. Deletion is accomplished by replacing the unwanted college with the last college in the file and zeroing the latter's old file position. This process avoids creating gaps in the COLLEG.FIL data file. Sorting of the file, although unnecessary for the strict functioning of either CHOOSE.BAS or MAINT.BAS is then indicated, but it is not done automatically as it could run into a great deal of time.

Change a college characteristic. Changing a piece of information about a college is accomplished by breaking the college's file string in two at the proper location, inputting the new material, and reassembling the string. Sorting may or may not then be in order, depending on what information was changed.

List colleges and numbers. Since many activities in MAINT.BAS and CHOOSE.BAS require that the user know the number of the college he or she wants to act upon, this option provides a list of colleges either by college number or in alphabetical order, which may be output to a hard copy printer. It is at this point that reordering of the file occurs if requested. Reordering consists of sorting the file itself on the basis of college numbers, followed by the sorting of the FILEPOS%() array according to correct alphabetical order. In this manner, file listing by college number is accomplished by going down the ordered file, and alphabetical listing is done by keying through FILEPOS%(). Both the file sorting and alphabetical ordering routines are bubble sorts.

List college items. Since it is often useful for the user to know what the computer has stored (and/or what it may ask next), this option provides a list of college characteristics stored in the COLLEG.FIL data file. The names of these items are drawn from in-core arrays that are generated at the beginning of each program run of either CHOOSE.BAS or MAINT.BAS. The list of items provided can also be used by the guidance counselor as a pre-coding sheet for assembling a college's data clearly and concisely before it is entered into the file. This list may also be output to a hard copy printer.

Dump the file. For ease in checking and/or modifying the data file or one of the package's programs, this option performs a simple dump of the material contained in the COLLEG.FIL data file. (Note: A similar utility exists in CHOOSE.BAS, hidden at line 2100 and invisible to the student user.)

The CHOOSE.BAS program is also menu driven, and includes the following options:

Add a specification. This option produces a secondary menu which allows the student user to select which college characteristic he or she wishes to specify (e.g., location, enrollment, etc.) For some characteristics, a third menu is presented (e.g., college majors). In each case the specification itself is then input, and the file is searched for qualifying colleges. "Qualifying" for most characteristics is defined as an exact match between the input specification string and the appropriate subfield of the stored college string. However, for college costs schools of lesser expense than that specified are considered qualifiers, as are those with later application deadlines when that characteristic is specified. Upon completion of the search/comparison, the number of qualifying colleges is printed. The sequential file positions (in COLLEG.FIL) of qualifying colleges are stored in the QUAL%() integer array. When a new specification is made, the last qualifying set is shifted to the OLDQUAL%() integer array and the new one takes its place in QUAL%(). There is an arbitrary maximum of 25 specifications.

Delete the last specification. A student user is often wont to make a specification that eliminates every college from consideration. To get back to the same point, he or she would have to re-input all previous specifications up to the final fatal one. Such a frustrating and time-consuming process could greatly diminish the system's use, and hence its usefulness. This option provides a means by which the last specification made can be removed while leaving the earlier ones in force. This is accomplished by equating the active QUAL%() array to the once-removed qualifying array OLDQUAL%().

List active specifications. As each specification is made, a description of it is stored in an in-core string array. This option dumps that array, listing the specifications which are currently in force. The user has the opportunity to dump this list to a hard copy printer.

List qualifying colleges. When the student user has reduced the number of qualifying colleges to a number that he or she deems reasonable, the need arises to know the names of the colleges that have been isolated. This option gets the file positions of the qualifying colleges from the QUAL%() array and proceeds to get the number, name, and address of each qualifying college from the COLLEG.FIL data file. A list, which the user may output to hard copy, is then printed.

List a college's information. If a student user wishes to see all the information stored in COLLEG.FIL for a particular college, he or she may do so by getting its college number (from the list provided to the counselor through Menu Option 5 of MAINT.BAS or from the qualifying colleges list obtained above) and running this option. Again, this list can be output to the user's keyboard or to a different terminal.

Restart. To provide ease of exploration and/or quick recovery after a mistake, this option zeros the OLDQUAL%() array and the SPEC$() specification array, and reinitializes the QUAL%() array to include all colleges in the data file.

Notes and Suggestions

The CHOOSE College Selection Package was written to be primarily CRT-based, using RSTS/E's capabilities to get hard copy output only when needed. Though nothing about the programs in the package precludes their being run entirely on paper terminals, some minor modifications (e.g., removal of screen clearing commands) may be desirable. As packaged, the CHOOSE programs expect a line width of 80 characters, and utilize both upper- and lower-case letters. Both CHOOSE.BAS and MAINT.BAS are strictly interactive and always prompt the user with a question. Since both programs also contain "SLEEP" commands to facilitate reading, if such a prompt is not present at a given instant, it is forthcoming.

The CHOOSE programs, as packaged, include dimensions for only 21 colleges in the COLLEG.FIL data file. Since the quality of the information which the student receives from CHOOSE is proportional to the number of colleges in the file, this number should be as large as is possible at each installation. The process for increasing these dimensions is as follows:

> For MAINT.BAS: Increase the dimensions of FILEPOS%() and COLLEGE$() at line 910 and the zeroing loop upper limits (currently 20) at line 1220.
>
> For CHOOSE.BAS: Increase the dimensions of FILEPOS%() and COLLEGE$() at line 910 and the dimensions of OLDQUAL%() and QUAL%() at line 930.

(Note that in BASIC-PLUS virtual file storage, a zero subscript denotes a bona fide storage location.) Although the number of colleges stored in COLLEG.FIL necessarily depends on the on-line storage capabilities of each individual installation, this file should be absolutely as large as possible.

Both MAINT.BAS and CHOOSE.BAS are large programs, and COLLEG.FIL should be a large file. Since this package was written with its emphasis on clarity and ease of understanding in the educational/guidance environment, technical considerations in general, and space in particular, often took a back seat. For example, the source code for each of the programs take only 8-9k of core memory; the other 6-7k being absorbed by data and storage arrays. The virtual file structure, bubble sorts, and some repetitive programming were all employed due to their relative ease of understanding.

However, if program clarity is not at issue in a particular installation, then some improvements can be made. In particular, a separate program to create an items' names data file could be constructed from lines 1050-1080 of either MAINT.BAS or CHOOSE.BAS. This file could take the place of the present in-core arrays handling the items' names function. (It would actually require significantly more mass storage space and considerable CVT$$ and format adjustments, however.) Secondly, such luxuries as EXTEND mode, with its long variable names, could be eliminated. In the COLLEG.FIL data file itself, nearly half of the 230 bytes stored for each college are binary yes/no bytes which could be "bit crunched", reducing the necessary space by a factor of eight--perhaps enough to fit 3 or even 4 colleges into a 512-byte block instead of the present two.

Since the CHOOSE College Selection Package operates simply on agreement between MAINT.BAS and CHOOSE.BAS regarding what is put into the file and what is searched for in it, the system remains extremely flexible. For example, suppose a school's guidance staff would rather have only four levels of college admissions selectivity instead of five (e.g., O-Open, L-Liberal, T-Traditional, and C-Competitive). If the relevant INPUT phrases in both programs were edited to reflect this change, the programs would still work quite as well. Similarly, if a counselor had more need for "English as a second language" as a special program offering than "Independent study courses," merely changing the data statement at line 1060 in both programs would produce the desired realignment. Indeed, the CHOOOSE system itself could easily be modified to handle multiple files as well, perhaps for junior colleges, vocational schools, and possibly even occupations.

Such flexiblity comes, however, at the price of incomplete idiot-proofing, primarily in MAINT.BAS. Since the programs can accept anything for college affiliation, for example, an affiliation code could be mistakenly entered into the file that would never match a student's request for a standard affiliation--thus eliminating the college from consideration upon specification of that characteristic. Dumping the file often (Menu Option 7 of MAINT.BAS) and checking it for mistakes is a good procedure to observe while building it, as is utilizing the items list (Menu Option 6 of MAINT.BAS) to pre-code college information for clear data entry.

As with any virtual file and its associated programs, appropriate consideration should be given to the accounts and protection codes under which the CHOOSE College Selection Package runs. It is suggested that the MAINT.BAS program and the COLLEG.FIL data file be located in one account and the CHOOSE.BAS program in another to provide sufficient security to the data file. Alternatively, another effective technique would be to simply grant temporary privileges to the use of CHOOSE.BAS in its compiled form. Due to space considerations, both programs should be stored for use in their compiled state if at all possible.

For further information regarding the use of the MAINT.BAS and CHOOSE.BAS programs, please refer to the "CHOOSE Counselor's Guide" and the "CHOOSE Student's Guide." Individuals with questions or suggestions about the implementation or use of the CHOOSE College Selection Package are urged to contact the developer directly.

CHOOSE COLLEGE SELECTION PACKAGE

General Record Definition Table

College Cnaracteristic	Starts on Byte	Length
College Number	1	4
College Name	5	20
College Address	25	20
Zip Code	45	5
Telephone Number	50	13
Location Code	63	2
Community Code	65	1
Enrollment Code	66	1
Sex Code	67	1
Affiliation Code	68	4
Admissions Codes		
Selectivity Code	72	1
Tests Code	73	3
Application Deadline	76	5
Comprehensive Costs		
In-State	81	2
Out-of-State	83	2
Financial Aids	85	5
Special Programs	90	8
College Majors	98	97
Sports		
Intercollegiate	195	15
Intramural	210	15
Edit Date	225	6

CHOOSE COLLEGE SELECTION PACKAGE

College Majors Field Definition Table

Category of Majors	Starts on Byte	Length
Agriculture	98	7
Business	105	6
Communications	111	6
Education	117	8
Engineering	125	8
Fine/Applied Arts	133	10
Foreign Languages	143	8
Health Professions	151	9
Humanities/Liberal Arts	160	8
Mathematics	168	4
Science	172	10
Social Science	182	13

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CHOOSE Counselor's Guide

by

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In the CHOOSE College Selection Package, the high school guidance staff has the responsibility of building and maintaining the COLLEG.FIL data file which the CHOOSE.BAS program uses to answer students' requests about colleges. While this may be an unusual and possibly uncomfortable responsiblity for many counselors, the MAINT.BAS program was written expressly for counselors and flows pretty easily and smoothly. Interactions with the computer consist primarily of selecting options from a menu and answering yes/no questions. In any situation where input to the file is done, the opportunity always exists to make later changes or to correct mistakes. By having the guidance counselor build the college data file with MAINT.BAS, it is hoped that stored information will be more appropriate to local needs, more readily and easily updated, and that the counselor will be more personally involved with the increasingly vital application of computers in dispensing accurate guidance information.

Suggestions Prior to Building the COLLEG.FIL Data FIle

The information which the CHOOSE.BAS program provides to students is only as good and complete as the COLLEG.FIL data file. For this reason, the data file should be built as large as possible. As packaged, the COLLEG.FIL can only hold 21 colleges. This small number is easily increased by minor changes in the MAINT.BAS and CHOOSE.BAS programs. These changes are described on page 5 of the "CHOOSE System Manager's Guide."

After the packaged programs have been modified to allow as many colleges in the COLLEG.FIL data file as the particular computer installation will permit, the file itself must be built. The recommended way to go about this is to first run the MAINT.BAS program and select Menu Option 6. This option lists all the types of information that are stored by the COLLEG.FIL data file for each college. This list should be used as a checklist for locating and coding information about a particular college that eventually will be entered into the data file. The information itself can be accumulated from any reliable source, including college catalogs or a composite college information book such as *Barron's Profiles of American Colleges*, *Peterson's Annual Guide to Undergraduate Study*, or the *CEEB College Handbook*. Coding this information *before* sitting down at the computer makes for a faster, easier, and more enjoyable data entry process.

In order to detail this pre-coding process more fully, let us consider what items are actually stored and how they are coded in the data file. The first item on the list, and the first thing asked for when the file is built, is the college number. College numbers are important to the CHOOSE system because they provide an essential way to locate a particular college within the file. College numbers are, however, entirely arbitrary relative to anything else, i.e., you may use whatever college numbers you prefer, as long as there are no duplicates. College numbering will be again considered in the discussion of Menu Option 1 of MAINT.BAS: Zeroing and building the COLLEG.FIL data file.

Immediately following the college number, the college name is stored. The college address (city and state abbreviation) follows the name. Each of these items has a 20-character limit, so pre-coding should indicate which 20 characters (or less) will be used for each. For example, the "Massachusetts Institute of Technology" could be coded as "Mass Inst of Tech", or even simply as "M.I.T." After the address, the standard zip code is stored, followed by the college telephone number in this format: (603)735-5126.

Starting with the next item, location, coding begins in earnest. The data file stores a 2-character code representing which of nine general areas the college is located in. These areas and their codes are:

NE - New England (CT, ME, MA, NH, RI, and VT)
MA - Middle Atlantic States (DE, DC, MD, NJ, NY, and PA)
GL - Great Lakes States (IL, IN, MI, OH, and WI)
PL - Plains States (IA, KS, MN, MO, NE, ND, and SD)
SE - Southeast (AL, AR, FL, GA, KY, LA, MS, NC, SC, VA, and WV)
SW - Southwest (AZ, NM, OK, and TX)
RK - Rocky Mountain States (CO, ID, MT, UT, and WY)
FW - Far West (AK, CA, HI, NV, OR, and WA)
OT - Other Areas (Canada, Europe, etc.)

In pre-coding a college for entry into the file, the appropriate 2-letter code should be indicated on the items list after the text "Location Code".

Following the location code, a single-letter code is stored representing the type of community in which the college is situated. The codes for "type of community" are:

U - Urban Environment
S - Suburban Environment
R - Rural Environment
C - Separate College Community

The last code introduces a gray area. By entering a "C" into the file, any student search for a rural environment ("R"), for example, would not return a "C" college. Yet many colleges with separate community environments are very much in the country. There are no hard-and-fast rules about this, but one guideline is to consider the availability of standard student supplies and services (e.g., clothing stores, laundromats, grocery stores, restaurants, etc.) If these services are available near the college, largely due to the presence of the college, then a "C" code may be warranted. If these services exist as part of a larger community that the college happens to be in or near, then an "U" or a "S" code is probably in order. Finally, if these types of services are unavailable nearby, then an "R" rating would seem justified. In cases where the counselor cannot be certain of the local environment of a college, the most important guideline is to be consistent, so the CHOOSE.BAS program yields consistent information to its student users. One such procedure, albeit a drastic one, would be to eliminate use of the "C" code altogether.

The next item stored on the file is a single-letter code for the enrollment of the college. The codes and their interpretations are:

S - Small: Under 2,000 students.
M - Medium: Between 2,000 and 6,000 students.
L - Large: Between 6,000 and 15,000 students.
X - Very Large: Over 15,000 students.

These particular interpretations are also not necessarily fixed, and may be changed, to 1, 8, and 16 for example, as long as consistency reigns.

Along with knowing how large a college is, it is important for the high school student to know whether or not the college is a single-sex school. The codes for sex are:

M - All male enrollment
F - All female enrollment
B - Both sexes (Co-educational enrollment)

Following the sex code, a 3- or 4-character code for the college's affiliation is stored. These codes include:

PUB - Public
PRIV - Private
CATH - Catholic
BAPT - Baptist
JEW - Jewish
LDS - Latter Day Saints
LUTH - Lutheran
METH - Methodist
PRES - Presbyterian
UCC - United Church of Christ
OTH - Other Affiliation

Note that religious college affiliations are often merely historical associations or of otherwise marginal significance to daily student life. In general, it is recommended that students avoid specifying a particular affiliation when using the CHOOSE.BAS program unless there are important reasons to do so.

The next items stored in the COLLEG.FIL data file relate to the admissions characteristics of the college. The first of these is a single-letter code representing the selectivity of the college. Some college source books list selectivity scales of their own, or the counselor can develop his or her own scales on the basis of test scores or other measures. As packaged, the CHOOSE system includes five selectivity levels:

M - Most Competitive Admissions
V - Very Competitive Admissions

C - Competitive Admissions
L - Less Competitive Admissions
N - Non-competitive Admissions

Both the number of levels and their descriptions can easily be changed with some minor text editing of the MAINT.BAS and CHOOSE.BAS programs, followed by the consistent use of whatever levels are chosen.

Following selectivity is a 3-character code representing the standardized testing preferences of the college. These codes are:

SAT - College accepts SAT's only.
ACT - College accepts ACT's only
S/A - College prefers SAT's but accepts ACT's.
A/S - College prefers ACT's but accepts SAT's.
A=S - College accepts either SAT's or ACT's equally.
S+T - College requires SAT's and Achievement Test(s).
NON - College requires no standardized test scores.

Like affiliation, students should avoid specifying test codes as a search criterion in the CHOOSE.BAS program. A college which prefers SAT's but accepts ACT's ("S/A") for example, would be eliminated from consideration if "SAT" was specified in CHOOSE.BAS.

The final admissions characteristic, the fall term application deadline, is stored in a 5-character (maximum) string of the general form: "MM/DD", e.g., 2/15 for February 15th. In cases of rolling admissions or no deadlines, the word "NONE" must be entered as the code for this characteristic. Note that because the comparison routines in CHOOSE.BAS convert the date to a number and interpret larger as later, December 31st (12/31) would be considered after January 1st (1/1). For this reason, no fall term application deadlines prior to January 1st (1/1) should be used. Few, if any, exist anyway.

The next college characteristics stored in the data file are the in-state and out-of-state comprehensive cost codes. Each of these is a one or two digit number representing the sum of tuition, room and board, and books and fees for the college, rounded to the next highest thousand dollars. For example, suppose College X's in-state tuition was $3,635; its living expenses $4,250; and its books and fees $325. College X's code would be "9" since its comprehensive cost ($8,210) is less than $9,000 (but greater than $8,000). In-state and out-of-state comprehensive costs are entered separately in MAINT.BAS and can be individually specified in CHOOSE.BAS.

The remainder of the items coded onto the pre-coding sheet and stored in the COLLEG.FIL data file are all single-character "Y" or "N" (Yes or No) codes indicating whether or not a particular type of financial aid, special program, college major, or sport is offered at the college. There are five types of financial aid stored:

Need-based scholarships
Basic Educational Opportunity Grants
Work opportunities
Loans
Other kinds of financial aid

Eight special programs are included:

Advanced standing or credit by examination
Remedial or skill-building programs
Student designed majors
Independent study courses
Program(s) for study abroad
Work/study program(s)
Reserve Officers Training Corps (ROTC)
Other special programs or services

Note that if a particular type of financial aid or a special program which is not included here would be more appropriate to local needs, one of these items can be replaced by the simple editing of a data statement. This process is described on page 6 of the "CHOOSE System Manager's Guide."

The remaining college characteristics, majors and sports offered, are Y/N single-character codes, but with an added consideration. Both groups are divided into subcategories. Specific college majors are grouped according to general academic areas or "departments," and sports differentiate between intercollegiate and intramural competition. Please see the items list (pre-coding list) for a complete list of majors and sports offered.

Note that each category of academic endeavor, and each sport grouping, contains as a specific major (or sport) the subcategory "Other." Due to space limitations not every college major or sport can be included in any computer-based system, so the "Other" subcategory provides a way to include unspecified majors and sports offerings. For example, a college offering a major in ceramics should have a "Y" coded under the subcategory "Other areas in Fine or Applied Arts" since ceramics itself is not explicitly listed as a major. Similarly, a college offering intercollegiate fencing should have a "Y" coded under intercollegiate "Other sports."

Building and Maintaining the COLLEG.FIL Data File

Once the colleges have been pre-coded, the actual construction of the COLLEG.FIL data file is relatively quick and easy. By running Menu Option 1 of MAINT.BAS, the data file is zeroed (cleaned out and space reserved) and data entry can begin. Since zeroing the file is equivalent to permanently erasing it, and thus a potentially dangerous opportunity, MAINT.BAS double checks that such is the true intention of the user before actually going ahead with the zeroing process.

After the file has been zeroed, MAINT.BAS automatically starts preparing to build the data file by printing brief instructions about entering college information. During these instructions, the counselor will encounter this question:

```
  Continue?
```

This question merely serves to stop the printed output from running off the screen of a video terminal before it can be read. Hitting the "RETURN" key (a move commonly called a "<cr>", for "carriage return") will cause the output to continue coming. When through with its brief instructions, MAINT.BAS prints:

```
  College #1
  -------------

  College Number:  ?
```

At this point the program is asking for the college number of the first college that is to be stored. The college number may be any number the counselor wishes as long as it is not duplicated later. The number can be the same as the number printed by MAINT.BAS (e.g., College #1, etc.), but it need not be if the counselor prefers an alternate arrangement.

The college number question also provides the stopping mechanism to cease entering colleges. If a valid number is typed, then the program goes on to ask for the college name, address, and all the other information. But if the college number query is answered with a <cr> (a push of the "RETURN" key) at any point, then MAINT.BAS assumes that the counselor has entered all the colleges he or she wishes to for the moment, and it returns to the main program menu. When inputting college information, be certain to enter all the information for a college before stopping. Stopping in the middle of a college's information (either via a CTRL-Z or a CTRL-C) will at least result in the omission of that college from the data file, and could possibly damage the file itself.

Note that zeroing and building the COLLEG.FIL data file should be an extremely rarely used option; in general it need only be used once. More colleges may be added to the file, using precisely the same entry techniques, through Menu Option 2 of MAINT.BAS. It is neither necessary nor desirable to rebuild the file in order to add colleges to it.

The entry of an individual college's information corresponds exactly to the pre-coding list discussed earlier. The only aspect of this process which deserves further mention concerns the areas of college majors and sports. In entering college majors, MAINT.BAS first asks:

```
  Does this college offer any majors in Agriculture?
```

If the answer to this question is affirmative, then the six specific majors within the area of agriculture are each asked. If the answer to this question is negative, however, then the next question is:

```
  Does this college offer any majors in Business?
```

The program automatically understands a negative response to the agriculture question as applying to all six of the specific agricultural majors. This process occurs similarly for all twelve general academic areas. As an example, if College X offered majors in both Zoology and Wildlife Management then the relevant dialogue would look like this: (Underlined sections are those typed by the counselor. A <cr> = 'RETURN'.)

```
  "Academic Majors" Codes:

   Does this college offer any majors in Agriculture?  Y<cr>
   Specifically, does it offer:
    Major(s) in Agriculture (general)? N<cr>
    Major(s) in Zoology/Animal Sciences?  Y<cr>
    Major(s) in Forest Sciences?  N<cr>
    Major(s) in Botany/Plant Sciences?  <cr>
    Major(s) in Wildlife Sciences/Management?  Y<cr>
    Major(s) in other areas in Agriculture?  <cr>

   Does this college offer any majors in Business?
```

On the other hand, if College X offered no agricultural majors of any sort, then the same dialogue would go as follows:

"Academic Majors" Codes:

Does this college offer any majors in Agriculture? N<cr>

Does this college offer any majors in Business?

All agricultural majors automatically receive a "N" coding in this latter example. The dialogue for sports operates on the same principle, using intercollegiate and intramural sports as its two general categories.

Note that during the input of financial aids, special programs, college majors, and sports; responding to a question with a <cr> is equivalent to answering with an explicit "N" or "NO". It is not necessary to type the "N" if a <cr> is typed alone. Note also that some of the majors used by the CHOOSE package could be known by other names or could include a variety of related submajors. Thus some discretion is necessary when pre-coding and entering college information. For example, a college which offers a major in Reading Education, which is not specifically listed under the general academic area of Education, should have the question "[Does this college offer] Major(s) in Special Education?" and/or the question "[Does this college offer] Major(s) in other areas in Education?" answered affirmatively.

The third menu option of MAINT.BAS (Menu Option 3) is used to delete a college that is no longer wanted on the file. This option might be used because the college closed, merged, or should be replaced by a more vital college if the size of the data file is limited. To delete a college, the counselor must specify its college number in response to MAINT.BAS's request, whereupon the program deletes the college and it's information, sends a message indicating that the deletion has been completed, and returns to the main program menu.

It is often necessary to be able to change the information stored in the data file, either to correct mistakes made in entering the information or simply to bring it up to date. To modify the information stored for a particular college, Menu Option 4 of MAINT.BAS is selected. This option first asks for the college number of the school in which a change is needed, and then displays a second menu requesting which college item requires modification. When one of the items is selected, the program prints what is currently stored for that item, and then begins the standard input routine for entry of the new data. (Responding to this menu with a <cr> alone causes a return to the main program menu with no changes being made.)

Once a change has been made, the program alters the edit date for the college (a date stored with the college's information indicating how long the information has been on the file since it was updated), and asks the user if there are more changes to be made. If not, the program returns to the main menu. If so, MAINT.BAS asks: "For the same college?" Answering this question affirmatively avoids the necessity of re-entering the same college number. A negative answer implies that the remaining changes are for different colleges, and the college number inquiry is again posed.

As is clear from the discussion of the above menu options, it is often important to know the college number of a particular college. Menu Option 5 of MAINT.BAS prints a reference list of colleges with their numbers. If any changes have been made in the file (by adding a college, deleting a college, or changing a college's number or name) such that its order has been affected, then MAINT.BAS informs the counselor and asks if the file should be ordered before the requested list is printed. The counselor should respond affirmatively to this question, since the CHOOSE programs operate best when the file is in order. If not, however, the counselor still has the opportunity to receive an unordered listing by college number.

If the file is in a sorted state, or if the counselor elects to have the unsorted file ordered, MAINT.BAS asks whether the counselor prefers a numerical or alphabetical listing, whether the edit dates should be included on the list (<cr> = "NO"), where the list should be output to (<cr> = current terminal), and finally waits with a "Pause?" question to allow time to position the paper properly on a hard-copy terminal. Typing a <cr> will then start the printing of the list.

Menu Option 6 of MAINT.BAS, as has been previously discussed, lists all of the items stored for each college. This list is useful to student users of CHOOSE.BAS to see what they can ask for and what might be asked of them. It is also useful to the counselor as a pre-coding sheet for entering college information.

Menu Option 7 of MAINT.BAS provides a simple dump of the COLLEG.FIL data file to the current terminal. The number of colleges is indicated, and then each college's information string is printed in its packed form. Though most useful in modifying or debugging technical enhancements to the CHOOSE system programs, this option can also serve as a list to unceremoniously verify either changes or original input to the file.

Menu Option 8 closes the COLLEG.FIL, prints a concluding message, and exits back to a "Ready" state on the computer.

Notes and Suggestions

The CHOOSE College Selection Package was written to be primarily used on video terminals (CRT's), utilizing the computer's capabilities to get paper (hard copy) output only when needed. Though nothing about the programs in the package precludes their being run entirely on paper terminals, some minor modifications (e.g., removal of screen clearing commands) may be desirable. As packaged, the CHOOSE programs expect a line width of 80 characters, and utilize both upper- and lower-case letters. Both CHOOSE.BAS and MAINT.BAS are strictly interactive and always prompt the user with a question. Since both programs also contain "SLEEP" commands to facilitate reading, if such a prompt is not present at a given instant, it is forthcoming.

As mentioned earlier the CHOOSE programs, as packaged, create a COLLEG.FIL that can only hold 21 colleges. Since the quality of information which a student gets from CHOOSE is directly proportional to the number of colleges in the file, this number should be as large as the particular computer installation can permit. Minor changes to the programs, which are discribed on page 5 of the "CHOOSE System Manager's Guide", are necessary to enlarge the data file.

Since there is no single "best" approach for all students in utilizing a computer-based college information system, the CHOOSE system allows both deductive searching (successive specification of criteria) and direct access to single colleges. Pre-computer consultations between the counselor and the student are recommended to design individualized search strategies. The counselor can aid in determining the most important college characteristics for each student, and help him or her prioritize the importance of various characteristics. Such a priority list can better direct a computerized information search and hence make it much more effective.

Follow-up sessions between the student and the counselor are even more important. Depending on the size of the COLLEG.FIL data file and the care with which it is maintained, the CHOOSE system can provide students with accurate information about colleges specifically suited to their individual needs and preferences. However, even the best information is useless if not utilized in an appropriate decision-making framework. The CHOOSE system is merely a tool to help the counselor concentrate less on the information needs of his or her students, and more on their need for decision-making assistance and instruction. By using such a tool, the counselor can be more helpful, more effective, and more in concert with his or her humanistic orientation.

For further information regarding the use of the MAINT.BAS and CHOOSE.BAS programs, please refer to the "CHOOSE System Manager's Guide" and the "CHOOSE Student's Guide." Individuals with questions or suggestions about the implementation or use of the CHOOSE College Selection Package are urged to contact the developer directly.

CHOOSE Coding Reference List

Location Codes:

NE - New England (CT, ME, MA, NH, RI, and VT)
MA - Middle Atlantic States (DE, DC, MD, NJ, NY, and PA)
GL - Great Lakes States (IL, IN, MI, OH, and WI)
PL - Plains States (IA, KS, MN, MO, NE, ND, and SD)
SE - Southeast (AL, AR, FL, GA, KY, LA, MS, NC, SC, VA, and WV)
SW - Southwest (AZ, NM, OK, and TX)
RK - Rocky Mountain States (CO, ID, MT, UT, and WY)
FW - Far West (AK, CA, HI, NV, OR, and WA)
OT - Other Areas (Canada, Europe, etc.)

"Type of Community" Codes:

U - Urban Environment
S - Suburban Environment
R - Rural Environment
C - Separate College Community

Enrollment Codes:

S - Small: Under 2,000 students.
M - Medium: Between 2,000 and 6,000 students.
L - Large: Between 6,000 and 15,000 students.
X - Very Large: Over 15,000 students.

Sex Codes:

M - All male enrollment
F - All female enrollment
B - Both sexes (Co-educational enrollment)

Affiliation Codes:

PUB - Public
PRIV - Private
CATH - Catholic
BAPT - Baptist
JEW - Jewish
LDS - Latter Day Saints
LUTH - Lutheran
METH - Methodist
PRES - Presbyterian
UCC - United Church of Christ
OTH - Other Affiliation

Selectivity Codes:

M - Most Competitive Admissions
V - Very Competitive Admissions
C - Competitive Admissions
L - Less Competitive Admissions
N - Non-competitive Admissions

"Tests Required" Codes:

SAT - College accepts SAT's only.
ACT - College accepts ACT's only
S/A - College prefers SAT's but accepts ACT's.
A/S - College prefers ACT's but accepts SAT's.
A=S - College accepts either SAT's or ACT's equally.
S+T - College requires SAT's and Achievement Test(s).
NON - College requires no standardized test scores.

CHOOSE COLLEGE SELECTION PACKAGE

CHOOSE Student's Guide

by

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Introduction

The CHOOSE College Selection Program is a computer-based guidance tool which can help you in selecting a college by determining which colleges meet requirements that you impose. By specifying more and more characteristics that you want in a college, the number of qualifying colleges gets smaller and smaller until it is small enough to consider each college in more detail. At that point you can look through college catalogs or other resources, and then consult with your guidance counselor about making a wise college choice on the basis of this and other information.

Preparing to Use CHOOSE

The first step in using the CHOOSE computer program has little to do with the computer. Your counselor has a list of all the different college characteristics that are stored by CHOOSE. It is a good idea to sit down with him or her and your parents to talk over what characteristics in a college are important to you. By doing this, you can develop a priority list to punch into the CHOOSE program to see what it comes up with. It is certainly possible to make use of CHOOSE without a priority list, however; to explore a wide variety of possiblitities, for example, or just to "play" with the program.

Before launching into exactly how to use the CHOOSE program itself, it might be good to take a quick look at how it works. Let's say you specify that your college must be in New England. CHOOSE will get all the colleges located in New England out of its data file and tell you how many there are. If you then specify that your college must also be a medium sized school (i.e., that its enrollment must be between 2,000 and 6,000 students), CHOOSE will look at the New England colleges that it just set aside to see how many of them are medium sized. This might cut the number of colleges in half or more, and CHOOSE will report to you how many colleges meet both specifications.

If you made a third specification that the comprehensive costs of your college must be less than $5,000 (for in-state students), then CHOOSE would look at its last group of qualifying colleges (those of medium size located in New England) and see how many of them have comprehensive in-state costs of $5,000 or less. CHOOSE would then report how many colleges made this third cut. This process continues until you decide to list the names of the colleges that qualify. You can run CHOOSE through this process as many times as you like, specifying all sorts of different characteristics. In doing so, you can increase your awareness about selecting an appropriate college and better explore the opportunities available to you.

Using the CHOOSE Program

In order to use the CHOOSE program, you must first get onto the computer successfully. Procedures for getting onto computers ("logging in," as it is known) vary a lot from place to place, so check with your computer staff or guidance office about how to do it at your location. Once successfully logged in, you must run the CHOOSE program, which is usually accomplished by typing:

```
RUN CHOOSE
```

Remember to hit the "RETURN" key after this and everything that you want sent back to the computer. (Hitting the "RETURN" key is commonly symbolized as "<cr>" for "carriage return.") Some computer installations have different procedures for running programs, so check with the appropriate people if you can't get CHOOSE to run.

When you get CHOOSE running, it will print a brief introductory message, followed by a list of things you can do called the "main program menu:"

```
1. Add a college specification.
2. Delete the last specification.
3. List active specifications.
4. List qualifying colleges.
5. List all the information for a college.
6. Start over.
7. Exit from this program.
```

Let's see what each one of these choices does.

Add a College Specification (Main Option 1)

If you pick Main Option 1, you must want to add a college specification. This may be your first specification, or one of many (up to 25 are allowed). When you select this option, CHOOSE prints a second menu, which lists the college characteristics you may specify:

```
Here are the college characteristics you can specify.

    1. Location                          7. Costs
    2. Type of Community                 8. Financial Aids
    3. Enrollment                        9. Special Programs
    4. Sex                              10. Majors
    5. Affiliation                      11. Sports
    6. Admissions Characteristics

Please type the number of your choice?
```

When you select an option from this secondary menu, CHOOSE will ask you to enter what code you wish to specify for the characteristic you selected. For example, say you picked number 3, Enrollment. CHOOSE would then print:

```
Please enter the Enrollment Code that your
college must have:  (S, M, L, or X) ?
```

and wait for you to enter either an S, M, L, or X. (The meanings of these and other codes are described beginning on page 6 of this manual.) When you enter the code you want, CHOOSE prints how many colleges meet that requirement. For example:

```
7 colleges qualify.
```

CHOOSE will then type the line:

```
Main Option:  (Hit 'RETURN' to get list) ?
```

This is just a shorthand form of the main program menu. If you want to see the whole list, all you need to do is hit the "RETURN" key (i.e., do a <cr>) in answer to this question. If you already know what option you want without seeing the list, you can simply type its number.

Delete the Last College Specification (Main Option 2)

Sometimes when using the CHOOSE program, you make a specification that leaves you with no qualifying colleges. Occasionally, you may make a mistake when entering a specification, or enter a specification and then decide that you don't want to include it after all. Main Option 2 lets you erase the last characteristic you specified, thus returning you to the same number of qualifying colleges that you had before making that specification. This option runs automatically since it doesn't need any further input, and prints out a message when finished. After this message, the question:

```
Main Option:  (Hit 'RETURN' to get list) ?
```

is again asked, through which you can select another main menu option.

List Active Specifications (Main Option 3)

It is often nice to see what specifications you currently have in force while you are using CHOOSE. Main Option 3 of the program lists the active specifications and also prints the number of colleges qualifying under those specifications. Before this list is printed, however, CHOOSE asks two questions which allow you to have the list printed at another terminal if you'd like to. The first question is:

```
Output to:  ('RETURN' = this terminal) ?
```

If you wish to send the list to another terminal, answer this question by typing in the terminal's number (e.g., KB4:). If you just want the list printed at your terminal, just do a <cr>. The second question is:

```
Pause?
```

This question simply waits for a <cr>. If you are having the list printed at a paper terminal, this question allows you to position the paper properly before the printing starts. If the list is going to a video (CRT) terminal, then you can just do a <cr> and CHOOSE will get on with the printing. When the list is completed, CHOOSE asks the "Main Option?" question again.

List Qualifying Colleges (Main Option 4)

By adding more and more specifications, the number of colleges qualifying gets smaller and smaller. At some point, when you decide that the list is small enough, you want to see the names of the qualifying colleges. Main Option 4 of the CHOOSE program accomplishes this task. This option prints out the college number, name, and address of all the colleges which qualify according to your current specifications. Before the list is printed, you are asked the two questions:

```
Output to:  ('RETURN' = this terminal) ?

Pause?
```

in case you want to have the list printed elsewhere, just as in Main Option 3. As before, simply answer both questions with a <cr> if you do not. Note that the colleges' numbers are printed so you can use them with the next main menu option, which lists all the information stored for a particular college.

List All the Information for a College (Main Option 5)

The CHOOSE program stores much information about colleges which you may not have specified in arriving at your list of qualifying colleges. For example, you may not have wanted to eliminate colleges on the basis of their application deadlines or what tests they require for admission, but these are useful things to know about the colleges you're interested in and they are stored by CHOOSE. You can get a complete listing of all the information stored for a particular college by using Main Option 5 of the CHOOSE program.

In order to get all the information for a given college, however, you must know its college number. If you found the college by specifying college characteristics and then listing the qualifying colleges, the number was included on that list and you can find it there. If you have a particular college in mind but you don't know what its college number is, you can get it from a master list which your counselor either has or can get using another program from the CHOOSE College Selection Package.

Once you have told the computer what the college number is, CHOOSE once again asks the two questions:

```
Output to:  ('RETURN' = this terminal) ?

Pause?
```

in case you want to have the list printed at a different terminal. When it finishes printing the list, CHOOSE tells you how recent the information for that college is, and goes back to the "Main Option?" question.

Start Over (Main Option 6)

CHOOSE can help increase your awareness about colleges that might be suitable for you by printing out a list of colleges that meet criteria you have chosen. A good way to expand this exploration process is to run CHOOSE many times with differing sets of criteria. Main Option 6 promotes such exploration by making it easy to start a new round of specifications. This option removes all current specifications and starts the specifying process over again. Since there are no active specifications after a restart, all of the colleges in the data file then qualify. Like Main Option 3 (Delete the Last Specification), this option asks no questions. It merely prints a mesage to the effect that it is restarting, and when finished, returns you to the "Main Option?" question.

Exit from This Program (Main Option 7)

Selecting the seventh option of the main program menu is the proper way to leave the CHOOSE program to get back to a "Ready" on the computer. Whether you are done with CHOOSE and want to leave, or you just want to run a different program, Main Option 7 is the way to exit from CHOOSE.

Codes for Adding College Specifications

You will recall that when Main Option 1 (Add a College Specification) is chosen, this secondary menu (called the college characteristic menu) is offered:

1. Location
2. Type of Community
3. Enrollment
4. Sex
5. Affiliation
6. Admissions Characteristics
7. Costs
8. Financial Aids
9. Special Programs
10. Majors
11. Sports

When you select one of these characteristics, CHOOSE asks you to enter the code for that characteristic which your qualifying colleges should have. What are these codes and how do they work? Let's look at each one of the secondary menu options individually to find out.

Location (Option 1)

When you select Option 1 from the secondary menu, you tell CHOOSE that you want to specify the location of your college. CHOOSE responds by typing:

```
Please enter the Location Code that your college
must have:  (NE, MA, GL, PL, SE, SW, FW, RK, or OT) ?
```

In answer to this question, CHOOSE expects you to enter one of the nine 2-letter codes it lists in parentheses. The explanations of these codes are as follows:

NE - New England (CT, ME, MA, NH, RI, and VT)
MA - Middle Atlantic States (DE, DC, MD, NJ, NY, and PA)
GL - Great Lakes States (IL, IN, MI, OH, and WI)
PL - Plains States (IA, KS, MN, MO, NE, ND, and SD)
SE - Southeast (AL, AR, FL, GA, KY, LA, MS, NC, SC, VA, and WV)
SW - Southwest (AZ, NM, OK, and TX)
RK - Rocky Mountain States (CO, ID, MT, UT, and WY)
FW - Far West (AK, CA, HI, NV, OR, and WA)
OT - Other Areas (Canada, Europe, etc.)

Thus if you wanted to go to a college near the Pacific Ocean, you would type the code "FW" in answer to the question. When you enter your preferred code, CHOOSE searches its data file, prints the number of colleges having that location code, and returns to the "Main Option?" question.

Type of Community (Option 2)

When you select Option 2 from the college characteristic menu, you inform CHOOSE that you wish to specify the type of community environment that your college should have. CHOOSE acknowledges this by printing:

```
Please enter the "Type of Community" Code that
your college must have: (U, S, R, or C) ?
```

You answer this question by typing in one of the four single-letter codes. The meanings of these codes are as follows:

U - Urban Environment
S - Suburban Environment
R - Rural Environment
C - Separate College Community

A "Separate College Community" is an environment where there is the usual allotment of stores, restaurants, etc., but which probably wouldn't be there except for the college; an environment where it's hard to tell where the college stops and the community begins. CHOOSE prints the number of qualifying colleges and returns to the "Main Option?" question.

Enrollment (Option 3)

Selecting Option 3 from the college characteristics menu tells CHOOSE that you intend to specify the size of the undergraduate enrollment at your ideal college. CHOOSE, in turn, prints:

```
Please enter the Enrollment Code that your
college must have:  (S, M, L, or X) ?
```

You respond to this by entering one of the four single-letter enrollment codes. These codes are:

S - Small: Under 2,000 students.
M - Medium: Between 2,000 and 6,000 students.
L - Large: Between 6,000 and 15,000 students.
X - Very Large: Over 15,000 students.

CHOOSE prints the number of colleges qualifying, and returns to the main program menu.

Sex (Option 4)

If you choose Option 4 of the secondary menu, you can specify whether your college should be single-sex or coeducational. CHOOSE asks:

```
Please enter the Sex Code that your college
must have:  (M, F, or B) ?
```

You then enter one of the following three single-letter sex codes:

M - All male enrollment
F - All female enrollment
B - Both sexes (Co-educational enrollment)

Once again, CHOOSE responds by telling you how many colleges qualify, and then returns you to the main program menu.

Affiliation (Option 5)

Selecting Option 5 from the college characteristic menu makes CHOOSE ask the following:

```
Please enter the Affiliation Code that your
college must have:  (PUB, PRIV, CATH, BAPT
JEW, LDS, LUTH, METH, PRES, UCC, OTH) ?
```

You then enter the 3- or 4-character code that you want your colleges to have. The explanations of these codes are as follows:

PUB - Public
PRIV - Private
CATH - Catholic
BAPT - Baptist
JEW - Jewish
LDS - Latter Day Saints
LUTH - Lutheran
METH - Methodist
PRES - Presbyterian
UCC - United Church of Christ
OTH - Other Affiliation

College affiliation can be deceiving. Often a college's affiliation is only historical and doesn't really have much to do with daily student life at the college. Sometimes, however, a college's affiliation describes the college better than any other single item. Because of this variability, it is recommended that you specify this characteristic only when a particular affiliation is very important to you (e.g., you definitely wish to attend a Catholic collge.) Otherwise, specifying this characteristic could eliminate colleges from consideration that would actually be quite suitable for you. When this option is specified, CHOOSE prints the number of colleges that qualify, and then returns you to the main program menu.

Admissions Characteristics (Option 6)

Selecting Option 6 on the secondary menu tells CHOOSE that you wish to specify an admissions characteristic. CHOOSE stores three admissions characteristics: college selectivity (competitiveness), standardized tests required for admission, and the fall term application deadline. CHOOSE first asks which one of these characteristics you wish to specify:

```
Do you want to specify Selectivity, Tests, or
Application Deadline:  (S, T, or D) ?
```

You respond to this question by entering "S" if you want to specify selectivity, "T" if you want to specify tests required for admission, or "D" if you want to specify an application deadline.

Selectivity. If you entered "S" for selectivity, CHOOSE prints the following:

> Please enter the Selectivity Code that your
> college must have: (M, V, C, L, or N) ?

You type in the single-letter code that represents the selectivity level you wish. These codes are as follows:

M - Most Competitive Admissions
V - Very Competitive Admissions
C - Competitive Admissions
L - Less Competitive Admissions
N - Non-competitive Admissions

Before specifying a selectivity level, you may want to ask your counselor for examples of colleges in each category to get a better understanding of the type of college you're looking for.

Tests Required for Admission. If you enter a "T" for tests required, CHOOSE asks:

> Please enter the code for tests that your college
> must have: (SAT, ACT, S/A, A/S, A=S, S+T, or NON) ?

You respond by entering which of these 3-letter codes you want your college to have:

SAT - College accepts SAT's only.
ACT - College accepts ACT's only
S/A - College prefers SAT's but accepts ACT's.
A/S - College prefers ACT's but accepts SAT's.
A=S - College accepts either SAT's or ACT's equally.
S+T - College requires SAT's and Achievement Test(s).
NON - College requires no standardized test scores.

Like affiliation, you should be careful when specifying tests required for admission. For example, if you specify the "SAT" code, you eliminate all colleges which accept both SAT's and ACT's ("S/A" and "A/S" colleges), as well as all colleges which require both SAT's and Achievement Tests ("S+T" colleges). As a result, you should specify tests required only when you have a particularly good reason to do so.

Application Deadline. If you told CHOOSE that you wanted to specify an application deadline by answering its admissions question with a "D," it will print the following message and question:

> By specifying a deadline, you eliminate any colleges
> whose fall term application deadline lies BEFORE the

> date which you specify. January 1st (1/1) is the earliest possible deadline to specify.
>
> Please enter the deadline which you would like to specify in the form: MM/DD (e.g., 1/15, or 3/27) ?

Thus when you specify a deadline, CHOOSE only considers those colleges whose deadline is later than the one you specify (or equal to it). This option is primarily useful if you haven't gotten your applications sent out yet and wonder which colleges you can still apply to. Outside of this use, the deadline characteristic should be specified only rarely, like affiliation and tests required for admission. Whether you specify selectivity, tests required, or application deadline, CHOOSE prints the number of colleges that meet your specification and then returns you to the main program menu.

Costs (Option 7)

Since CHOOSE allows you to specify either in-state or out-of-state comprehensive costs, the first question it asks concerns which one you want:

> Want to specify In-State or Out-of-State Cost (I or O)?

Enter an "I" if you want to specify in-state costs and an "O" to specify out-of-state expenses. CHOOSE then asks for the comprehensive cost code for whichever you specified. For example:

> Please enter the In-State Cost Code that your college must have: (1, 2, 3, ...) ?

Comprehensive college costs include annual tuition, room and board, and books and fees. A good way to consider this question is to estimate how much you and your family will be able to afford for one year's college education. You should then adjust this amount to your personal situation, i.e., add any money you might get from relatives, scholarships, etc., or if you plan to live at home, add what would be your room and board costs to the amount you can afford. Round this number to the next highest thousand, and chop off the zeros. The remaining number is the comprehensive cost code. Thus if you are looking for colleges whose in-state comprehensive costs are $5,000 or less, you would enter a "5" in response to CHOOSE's request for a cost code. The out-of-state cost code, though often significantly higher, works in precisely the same way. As usual, CHOOSE handles cost specifications by printing the number of qualifying colleges and then returning to the main program menu.

Financial Aids (Option 8)

If you select Option 8 on the college characteristic menu, CHOOSE prints a message and gives you a small menu of different kinds of financial aids:

```
I assume that you want to specify that your college
must offer a particular type of financial aid.
(You can specify more than one by running this
option more than once.)  Here are the types
which you can specify:

     1. Need-based scholarships
     2. Basic Educational Opportunity Grants
     3. Work opportunities
     4. Loans
     5. Other types of aid

Please enter the number of a type of financial
aid that your college must offer?
```

You don't have to know any special codes to respond to this question. To specify that your college must offer a certain type of financial aid, you simply type in its number. CHOOSE will then print the number of qualifying colleges and return you to the main program menu. If you'd like to specify more than one type of financial aid, simply run this option a second (or third, etc.) time.

Special Programs (Option 9)

When you select Option 9 from the secondary menu, you tell CHOOSE you want to specify that your college must offer a particular special program or service. Similar to its handling of financial aids, CHOOSE responds by printing a message and listing the special programs available:

```
I assume that you want to specify that your college
must offer a particular special program or service.
(You can specify more than one by running this
option more than once.)  Here are the programs
which you can specify:

     1. Advanced standing or credit by exam
     2. Remedial or skill-building programs
     3. Student designed majors
     4. Independent study courses
     5. Programs for study abroad
     6. Work/study programs
     7. ROTC
```

```
8. Other special programs or services

Please enter the number of a special program
that your college must offer?
```

Choosing one of these numbers sends CHOOSE looking for colleges which offer the special program represented by that number. Like financial aids, you can run this option as many times as you like in order to isolate colleges which offer all the special programs you want. CHOOSE prints the number of qualifying colleges and returns you to the main program menu.

<u>Majors (Option 10)</u>

Specifying college majors is much the same as specifying financial aids or special programs. When you select Option 10 of the college characteristic menu, CHOOSE prints a message followed by a list of general academic areas to pick from:

```
I assume that you want to specify that your college
must offer a particular major or field of study.
(You can specify more than one by running this
option more than once.) Here are the general
academic areas which you can specify:

     1. Agriculture
     2. Business
     3. Communications
     4. Education
     5. Engineering
     6. Fine/Applied Arts
     7. Foreign Languages
     8. Health Professions
     9. Humanities/Liberal Arts
    10. Mathematics
    11. Science
    12. Social Science

Please enter the number of a general academic
area that your college must offer?
```

After you select a general area by typing in its number, CHOOSE asks:

```
Do you want to specify a particular major
within that general area?
```

If you answer "YES" ("Y" alone will do) to this question, CHOOSE lists the specific majors available within that general academic area. The program will then ask which specific major you would like to specify, which you indicate by typing its number. For example, suppose you chose number 3 (Mathematics) as the general area you're interested in, and then said you'd like to specify an individual major in Mathematics as well. CHOOSE would print this list and question:

```
Here are the majors that you can specify
in Mathematics:

     1. Mathematics (general)
     2. Computer/Information Science
     3. Other areas in Mathematics

Please enter the number representing one of these
specific majors?
```

If you decide not to have the individual majors listed, CHOOSE will look for colleges that offer some sort of major within the general academic area you selected. In either case, CHOOSE lets you know how many colleges met your specifications, and then returns you to the main program menu. Note that each general academic area has "Other majors in ..." listed as an individual major. If you seek a college major that is not explicitly listed by CHOOSE, you should specify this "Other" category.

Sports (Option 11)

Selecting Option 11 of the college characteristics menu informs CHOOSE that you wish to specify a sport which your college must offer. This process is quite similar to specifying college majors. CHOOSE prints the following message and question:

```
I assume that you want to specify that your college
must offer a particular kind of sport.
(You can specify more than one by running this
option more than once.)

Of these two kinds of sports:

     1. Intercollegiate
     2. Intramural

Which are you interested in:  (Please type its number)?
```

Whether you respond with a "1" for intercollegiate sports or a "2" for intramural sports, CHOOSE goes on to print the list of available sports and to ask you which one you want:

Here are the intercollegiate sports which
you can specify:

1. Baseball
2. Basketball
3. Cross-Country Running
4. Football
5. Ice Hockey
6. Lacrosse
7. Skiing
8. Soccer
9. Swimming
10. Tennis
11. Track and Field
12. Volleyball
13. Wrestling
14. Other sports

Please enter the number of an intercollegiate
sport which your college must offer?

Like college majors, there is included an "Other sports" category for sports not explicitly listed. For example, if you wanted to specify that your college offer intercollegiate sailing, you would have to try the "Other sports" category and hope sailing is one of the "others" offered by the qualifying colleges.

Notes and Suggestions for Using CHOOSE

One thing that is important to know about using CHOOSE is that you cannot get trapped into doing something that you don't want to do. You can bail out of any question on any menu simply by typing a <cr>. Doing so will return you to the previous menu. Suppose, for example, you were about to specify an individual major in science, but then decided you'd better list the specifications currently in force before doing so. Typing a <cr> in reponse to the list of individual majors would return you to the list of general academic areas. Typing a <cr> there would return you to the college characteristics (or secondary) menu. Typing one more <cr> would take you back to the main program menu, where you could select Main Option 3 to list the active specifications.

CHOOSE is easiest to use on a video (CRT) terminal because of its many menus, but it can be used entirely on paper terminals as well. CHOOSE is strictly interactive, and always prompts you with a question about what you want to do or specify. If a question isn't present at a given moment, it is probably because CHOOSE is sleeping to give you time to read what's been printed or looking through its data file for qualifying colleges. A question will be forthcoming.

There are a variety of ways to use CHOOSE. As outlined earlier, one good way is to sit down with your counselor to make a priority list of the college characteristics most important to you, producing a list of qualifying colleges with CHOOSE on the basis of that priority list, researching those particular colleges more deeply, and finally taking the information you've gathered back to your counselor and parents for help in making your college attendance decisions.

CHOOSE can help in other ways too, however. For example, you can sit down and play with CHOOSE before going to your counselor. This gives you an idea of how CHOOSE works and what is available for options and opportunities. You can also run CHOOSE as often as you like with as wide a variety of specifications as you wish. This can help you explore college opportunities more fully. Finally, CHOOSE can continue to help after you've determined which colleges seem right for you by listing all the information it has about the colleges through Main Option 5 of the program.

Like any computerized system, CHOOSE has its strengths and its drawbacks. It was written to be fairly flexible, however, so if you have any suggestions for changes or improvements, please pass them along to your counselor or computer staff. Maybe he, she, or they can do something about it!

CHOOSE Coding Reference List

Location Codes:

NE - New England (CT, ME, MA, NH, RI, and VT)
MA - Middle Atlantic States (DE, DC, MD, NJ, NY, and PA)
GL - Great Lakes States (IL, IN, MI, OH, and WI)
PL - Plains States (IA, KS, MN, MO, NE, ND, and SD)
SE - Southeast (AL, AR, FL, GA, KY, LA, MS, NC, SC, VA, and WV)
SW - Southwest (AZ, NM, OK, and TX)
RK - Rocky Mountain States (CO, ID, MT, UT, and WY)
FW - Far West (AK, CA, HI, NV, OR, and WA)
OT - Other Areas (Canada, Europe, etc.)

"Type of Community" Codes:

U - Urban Environment
S - Suburban Environment
R - Rural Environment
C - Separate College Community

Enrollment Codes:

S - Small: Under 2,000 students.
M - Medium: Between 2,000 and 6,000 students.
L - Large: Between 6,000 and 15,000 students.
X - Very Large: Over 15,000 students.

Sex Codes:

M - All male enrollment
F - All female enrollment
B - Both sexes (Co-educational enrollment)

Affiliation Codes:

PUB - Public
PRIV - Private
CATH - Catholic
BAPT - Baptist
JEW - Jewish
LDS - Latter Day Saints
LUTH - Lutheran
METH - Methodist
PRES - Presbyterian
UCC - United Church of Christ
OTH - Other Affiliation

Selectivity Codes:

M - Most Competitive Admissions
V - Very Competitive Admissions
C - Competitive Admissions
L - Less Competitive Admissions
N - Non-competitive Admissions

"Tests Required" Codes:

SAT - College accepts SAT's only.
ACT - College accepts ACT's only
S/A - College prefers SAT's but accepts ACT's.
A/S - College prefers ACT's but accepts SAT's.
A=S - College accepts either SAT's or ACT's equally.
S+T - College requires SAT's and Achievement Test(s).
NON - College requires no standardized test scores.

CHOOSE COLLEGE SELECTION PACKAGE

MAINT.BAS Program Listing

by

Kenneth A. Colburn

Proctor Academy
Andover, New Hampshire 03216

```
1
        !
        !       MAINT.BAS

2!              PROGRAM         : MAINT.BAS
3!              PACKAGE         : CHOOSE College Selection Package
5!              VERSION         : V01
6!              EDIT            : 01
7!              EDIT DATE       : 6/30/80
8!
9!              AUTHOR          : Kenneth A. Colburn
                                  Proctor Academy
                                  Andover, NH  03216
10              EXTEND
11      !

        !         C O P Y R I G H T   N O T I C E

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!                        Kenneth A. Colburn
!                  Proctor Academy, Andover, NH.
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!       Disclaimer:
!       No warranty, expressed or implied, is made by the
!       author as to the accuracy or functioning of this
!       program or related material, and no responsibility
!       is assumed in connection therewith.


20      !

        !       M O D I F I C A T I O N   H I S T O R Y


!       VERSION/EDIT            EDIT DATE       REASON


100     !
```

```
        !       G E N E R A L   D E S C R I P T I O N

!       This program builds and maintains (adds, deletes, modifies,
!       and lists) the COLLEG.FIL college file used by the CHOOSE
!       College Selection Package.  Each college's data uses 230
!       bytes of a 256-byte virtual string in COLLEG.FIL.  File
!       access and maintenance is accomplished using standard DEC
!       string manipulation functions, and this program conforms
!       to DEC BASIC-PLUS programming conventions (STD-A001).
!       See the "CHOOSE System Manager's Guide" and the "CHOOSE
!       Counselor's Guide" for further information.

300     !

        !       I / O   C H A N N E L S

!       CHANNEL #:                      USED FOR:
!          1                            College file (COLLEG.FIL).
!          2                            Outputing lists to printer or file.


400     !

        !       V A R I A B L E   D E F I N I T I O N   T A B L E

!       NAME:                           USED FOR:
!       AREA$()                         General academic area.
!       BOGUS$                          Response to bad input.
!       BYTE%                           Starting byte for accessing subsections.
!       BYTE%()                         Starting byte for accessing subsections.
!       CHOICE%                         Menu selection.
!       CLEARJUMP$                      Clear screen and form feed.
!       COLLEGE$()                      Virtual college data string (2 coll./block).
!       CRLF$                           <cr> + <lf>.
!       D$                              Utility string.
!       D$()                            Utility string array for sports info.
!       D%                              Utility integer.
!       D1$                             Utility string.
!       D2$                             Utility string.
!       EDDATE$                         Switch for date inclusion in list.
!       ERL                             Standard error line.
!       ERR                             Standard error type.
!       FILEPOS%()                      File position array for alpha sorting.
!       FINAID$()                       Financial aid types.
!       FINISH%                         Loop limit.
!       HALFONE$                        Utility string for break/assemble.
!       HALFTWO$                        Utility string for break/assemble.
!       I$                      Version/Edit
!       I%                      Loop variable.
!       J%                      Loop variable.
!       J1%                     Loop variable.
!       JUMP$                   Form feed.
!       K%                      Utility variable for # of colleges in file.
!       KB$                     Output location for list.
!       L%                      Length for building subsection or field.
!       LONG%                   Length for accessing subsection or field.
!       MAJOR$(,)               Specific majors within general areas.
!       MAJORAREA%              Changing a single academic area.
!       NUM.OF.COLLEGES%()      Virtual storage of # of colleges on file.
!       NUMINAREA%()            Number of majors in an academic area.
!       SORTSWITCH%()           Sort status of file (0-ok, 1-needs sorting).
!       SPORT$()                Specific sports offered.
!       SPPROG$()               Specific special programs offered.
!       START%                  Loop beginning.
!       T$                      Horizontal tab.


800     !

        !       F U N C T I O N / S U B R O U T I N E   D E S C.


810     !

        !       S U B R O U T I N E S

!       LINE:           USE:
!       10100           Formats and truncates/fills number fields.
!       10150           Builds colleges' virtual strings.
!       10200           Inputs college number.
!       10250           Inputs college name.
!       10300           Inputs college address.
!       10350           Inputs zip code.
!       10400           Inputs phone number.
!       10450           Inputs location code.
!       10500           Inputs community code.
!       10550           Inputs enrollment code.
!       10600           Inputs sex code.
!       10650           Inputs affiliation code.
!       10700           Inputs admissions characteristics codes.
!       10750           Inputs cost codes.
!       10800           Inputs financial aids codes.
!       10850           Inputs special programs codes.
!       10900           Inputs college majors codes.
!       10950           Inputs sports codes.
!       11000           Gets date for storage.
!       11050           Splits college string to change middle.
!       11100           Re-assembles college string and adds date.
!       11150           Interchanges college strings during bubble sort.
```

A

```
!       11200           Interchanges file positions for alpha sort.
!       11250           Prints headers for college lists.
!       11300           Prints one college on list.
!       20100           Short-hand menu input.
!       20150           Formats and truncates/fills letter fields.
!       20200           Error message for bad college number.
!       20250           Handles output to, pause, & general header.
!       20300           Returns message to KB: if output file is different.

820     !

        !       F U N C T I O N S

!       NAME:                   LINE:           USE:
!       FNFORMATINPUT1$         27100           Takes one letter from input.
!       FNFORMATINPUT2$         27150           Capitalizes & crunches input.
!       FNFORMATINPUT3$         27200           Formats line input.
!       FNFORMATOUTPUT$         27250           Strips spaces from printed #.
!       FNCAPITAL$              27300           Capitalizes first letter.

900     !

        !       D I M E N S I O N   S T A T E M E N T S

910     DIM#1%, NUM.OF.COLLEGES%(0%), SORTSWITCH%(0%), FILEPOS%(20%),
                COLLEGE$(20%)=256%
                ! Number of colleges stored, whether the file is in a
                ! sorted state, array of file positions for alpha list,
                ! and the college's info in packed string form.

920     DIM FINAID$(4%), SPPROG$(7%), AREA$(11%), NUMINAREA%(11%),
                BYTE%(11%), MAJOR$(11%,13%), SPORT$(14%)
                ! Financial aids, special programs, fields of study, number
                ! of specific majors within those fields, where they start
                ! on the record, names of the specific majors themselves,
                ! and sports offered.
                !
                ! Non-file arrays are generated each time.  They could be done
                ! instead with a dummy file or a separate chaining program.
                !
                ! To increase file dimensions to include more colleges,
                ! increase COLLEGE$() and FILEPOS%() on line 910,
                ! and increase zeroing loop limits at line 1220.
                !

999     !

        !       M A I N   P R O G R A M   C O D E
```

```
1000    ON ERROR GOTO 19000%
                ! Set up standard error trap.

1010    I$="V01-01"+"           "+RIGHT(SYS(CHR$(6%)+CHR$(9%)+CHR$(0%)),3%)
                ! Set up header line; SYS call gets installation name.

1020    PRINT "MAINT    "+I$
                ! Print the header.

1030    D$=SYS(CHR$(6%)+CHR$(-7%))
                ! Enable ^C trapping.

1040    JUMP$=CHR$(12%)
        \ T$=CHR$(9%)
        \ CLEARJUMP$=CHR$(140%)+JUMP$
        \ CRLF$=CHR$(13%)+CHR$(10%)
        \ D$(0%)="intercollegiate" \ D$(1%)="intramural"
        \ D$(2%)="195" \ D$(3%)="210"
        \ BOGUS$=CRLF$+
          "     Bogus input or incorrect code.  Please check the"+CRLF$+
          "     CHOOSE Counselor's Guide and try again."+CRLF$
                ! Set up screen formatting and other constant variables.

1050    READ FINAID$(I%) FOR I%=0% TO 4%        ! Financial aid types.  &
        \ READ SPPROG$(I%) FOR I%=0% TO 7%      ! Special programs.     &
        \ FOR I%=0% TO 11%                      ! Categories of Study.  &
          \ READ AREA$(I%), NUMINAREA%(I%), BYTE%(I%)                   &
          \ FOR J%=0% TO NUMINAREA%(I%)-1%
            \ READ MAJOR$(I%,J%)                ! Specific majors in    &
          \ NEXT J%                             ! the field.            &
        \ NEXT I%
        \ READ SPORT$(I%) FOR I%=0% TO 13%      ! Sports offered.       &
                ! Read in type names for use in loops later.

1060    DATA    "need-based scholarships",
                "Basic Educational Opportunity Grants",
                "work opportunities", "loans", "other types of aid",

                "advanced standing or credit by exam",
                "remedial or skill-building programs",
                "student designed majors", "independent study courses",
                "programs for study abroad", "work/study programs",
                "ROTC", "other special programs or services"

1070    DATA    "Agriculture", 6, 98,
                "Agriculture (general)", "Zoology/Animal Sciences",
                "Forest Sciences", "Botany/Plant Sciences",
                "Wildlife Sciences/Management", "other areas in Agriculture",

                "Business", 5, 105,
                "Administration/Commerce/Management (general)",
                "Accounting", "Finance/Banking",
"Marketing/Purchasing", "other areas in Business",

"Communications", 5, 111,
"Communications (general)", "Advertising",
"Journalism", "Radio/TV Broadcasting",
"other areas in Communications",

"Education", 7, 117,
"Education (general)",
"Child Development/Pre-School Education",
"Elementary Education", "Physical Education",
"Secondary Education", "Special Education",
"other areas in Education",

"Engineering", 7, 125,
"Engineering (general)", "Chemical Engineering",
"Civil Engineering", "Electrical/Electronic Engineering",
"Industrial Engineering", "Mechanical Engineering",
"other areas in Engineering",

"Fine/Applied Arts", 9, 133,
"Art/Fine Arts (general)", "Architecture", "Art History",
"Dance", "Music", "Photography", "Studio Art",
"Theatre Arts/Drama", "other areas in Fine or Applied Arts",

"Foreign Languages", 7, 143,
"French", "German", "Italian", "Latin", "Spanish", "Russian",
"other Foreign Languages",

"Health Professions", 8, 151,
"Pre-Medicine", "Pre-Veterinary", "Medical Technology",
"Nursing", "Nutrition/Food Sciences", "Occupational Therapy",
"Physical Therapy", "other areas in the Health Professions",

"Humanities/Liberal Arts", 7, 160,
"Humanities/Liberal Arts (general)", "Creative Writing",
"English", "Literature", "Philosopy", "Religious Studies",
"other areas in the Humanities",

"Mathematics", 3, 168,
"Mathematics (general)", "Computer/Information Science",
"other areas in Mathematics",

"Science", 9, 172,
"Astronomy", "Biochemistry",
"Biology/Biological Sciences", "Chemistry",
"Ecology/Environmental Sciences", "Geology",
"Marine Sciences/Oceanography", "Physics",
"other areas in Science",

"Social Science", 12, 182,
"Social Science (general)", "Anthropology",
"Archaeology", "Area Studies/Geography",
"Economics", "History", "Human Services/Social Work",
"Pre-Law", "Political Science/Government", "Psychology",
"Sociology", "other areas in the Social Sciences"
```

```
1080    DATA    "Baseball", "Basketball", "Cross-Country Running",
                "Football", "Ice Hockey", "Lacrosse", "Skiing",
                "Soccer", "Swimming", "Tennis", "Track and Field",
                "Volleyball", "Wrestling", "other sports"

1100    !

        !       I N T R O D U C T I O N    A N D    M A I N    M E N U


1110    PRINT CLEARJUMP$
        \ PRINT "       This program builds and maintains the college"
        \ PRINT "       file for the CHOOSE college selection program."
        \ PRINT
        \ PRINT '       Please refer to the "CHOOSE Counselor';"'s Guide";'"'
        \ PRINT "       for information about running this program."
        \ SLEEP 4%
        \ OPEN 'COLLEG.FIL' AS FILE 1%
                ! Introduce the program & open the file.

1120    PRINT CLEARJUMP$
        \ PRINT "       The following options are available:"
        \ PRINT
        \ PRINT "                       1.  Initialize and build the college file."
        \ PRINT "                       2.  Add new college(s) to the file."
        \ PRINT "                       3.  Delete a college from the file."
        \ PRINT "                       4.  Change a college's file characteristics."
        \ PRINT "                       5.  List the colleges with their numbers."
        \ PRINT "                       6.  List college items stored by CHOOSE."
        \ PRINT "                       7.  Dump the file for debugging purposes."
        \ PRINT "                       8.  Exit from this program."
        \ PRINT \ PRINT
        \ INPUT "       Please type the number of your choice";D$
                ! Give menu.

1130    CHOICE%=VAL(FNFORMATINPUT1$(D$))
        \ IF CHOICE%<1% OR CHOICE%>8% THEN 1120% ELSE 1140%
                ! Input option choice.  If illegal, then repeat menu.

1140    ON CHOICE% GOTO 1200%,1300%,1400%,1500%,1900%,2000%,2100%,32700%
                !       Build  Add  Delete Change List  List  Dump  Exit
                !       File   One  One    Char.  Colls Stuff File


1200    !
        !       ZERO AND (RE)BUILD COLLEGE FILE.
        !

1210    PRINT CLEARJUMP$
        \ PRINT "       In order to create or rebuild the whole college file,"
        \ PRINT "       it first has to be initialized; a process which causes"
        \ PRINT "       all information currently in the file to be lost"
        \ PRINT "       forever.  Are you sure that you want to go ahead"
        \ INPUT "       with this";D$
        \ D$=FNFORMATINPUT1$(D$)
        \ IF D$<>'Y' THEN 20100%
                ! Double-check before zeroing.  If uncertain, back to menu.

1220    PRINT JUMP$;"   Please wait ..."
        \ NUM.OF.COLLEGES%(0%)=0% \ FILEPOS%(I%)=I% FOR I%=0% TO 20%
        \ COLLEGE$(I%)='' FOR I%=0% TO 20%
        \ PRINT JUMP$;" Initialization completed."
        \ SLEEP 5%
                ! Zero the college file & its counter, return to menu.


1230    PRINT CLEARJUMP$
        \ PRINT "       Please refer to the Counselor's Guide before"
        \ PRINT "       building the college file.  If you run into"
        \ PRINT "       any problems, don't worry.  You can correct them"
        \ PRINT '       later with the "change" option of this program.'
        \ PRINT "       Also, you can delete and/or add entire colleges"
        \ PRINT "       as often as you'd like."
        \ PRINT \ PRINT \ INPUT "       Continue";D$ \ PRINT \ PRINT
        \ PRINT "       In entering college data, please follow the"
        \ PRINT "       directions and coding instructions given in the"
        \ PRINT "       Counselor's Guide.  You can stop building the file"
        \ PRINT "       after any college has been input by hitting the"
        \ PRINT '       "RETURN" key in response to a request for the'
        \ PRINT "       next college number.  Note:  After you stop"
        \ PRINT "       building the file, further colleges can be added"
        \ PRINT '       only through the "add" option of this program.'
        \ PRINT \ PRINT \ INPUT "       Continue";D$ \ PRINT \ PRINT
        \ PRINT JUMP$;" Here we go ..."
        \ K%=0%
                ! Give basic instructions for the BUILD option.

1240    PRINT JUMP$
        \ PRINT "       College #";FNFORMATOUTPUT$(K%+1%)
        \ PRINT "       -------------" \ PRINT
        \ GOSUB 10200%
        \ IF CVT$$(D$,2%)='' THEN 20100% ELSE COLLEGE$(K%)=D$
                ! Check for exit request.  If so, then back to menu
                ! else start forming the college's file string.

1250    GOSUB 10250% \ GOSUB 10150%                 ! College name.         &
        \ GOSUB 10300% \ GOSUB 10150%               ! College address.      &
        \ GOSUB 10350% \ GOSUB 10150%               ! Zip code.             &
        \ GOSUB 10400% \ GOSUB 10150%               ! Phone.                &
        \ GOSUB 10450% \ GOSUB 10150%               ! Location Code.        &
        \ GOSUB 10500% \ GOSUB 10150%               ! Community Code.       &
        \ GOSUB 10550% \ GOSUB 10150%               ! Enrollment Code.      &
        \ GOSUB 10600% \ GOSUB 10150%               ! Sex Code.             &
        \ GOSUB 10650% \ GOSUB 10150%               ! Affiliation Code.     &
        \ PRINT \ GOSUB 10700% \ GOSUB 10150%       ! Admissions Data.      &
        \ PRINT \ GOSUB 10750% \ GOSUB 10150%       ! Cost Codes.           &
        \ PRINT \ GOSUB 10800% \ GOSUB 10150%       ! Financial Aid Types.  &
        \ PRINT \ GOSUB 10850% \ GOSUB 10150%       ! Special Programs.     &
        \ START%=0% \ FINISH%=11%                   ! Set loop limits, get  &
        \ PRINT \ GOSUB 10900% \ GOSUB 10150%       !  majors available.    &
        \ START%=0% \ FINISH%=1%                    ! Set loop limits, get  &
        \ PRINT \ GOSUB 10950% \ GOSUB 10150%    ! sports offered.      &
        \ GOSUB 11000% \ GOSUB 10150%           ! Attach edit date.    &
                ! Input a college's data in code form & build its string.

1260    K%, NUM.OF.COLLEGES%(0%)=K%+1%
        \ SORTSWITCH%(0%)=1% \ GOTO 1240%
                ! Update counter & file total, set switch, & go back for more.


1300    !
        !       ADD COLLEGE(S) TO THE FILE.
        !

1310    PRINT CLEARJUMP$
        \ PRINT "       Adding new colleges to the file is exactly like"
        \ PRINT "       entering them when the file is first built."
        \ PRINT
        \ PRINT "       You can add as many colleges as you want, but"
        \ PRINT "       please don't stop in the middle of a college."
        \ PRINT "       Also, be sure your file dimensions will hold the"
        \ PRINT "       number of colleges that you intend to add."
        \ PRINT
        \ PRINT "       When you are finished, simply hit the 'RETURN'"
        \ PRINT "       key in response to the request for the next"
        \ PRINT "       college number."
        \ PRINT \ PRINT
        \ K%=NUM.OF.COLLEGES%(0%)
        \ PRINT "       At present there are";K%;
        \ PRINT "colleges in the file."
        \ GOTO 1240%
                ! Give brief instructions, set counter to number of
                ! colleges presently in the file, and goto input routines.


1400    !
        !       DELETE A COLLEGE FROM THE FILE.
        !

1410    PRINT CLEARJUMP$
        \ PRINT "       In order to delete the information which is"
        \ PRINT "       stored for a particular college, you must specify"
        \ PRINT "       the college number of that college or university."
        \ PRINT "       Hitting the 'RETURN' key in response to this"
        \ PRINT "       will return you to the menu with no action having"
        \ PRINT "       been taken."
        \ PRINT \ PRINT
        \ PRINT "       What is the college number of the school you wish"
        \ INPUT "       to eliminate";D$
        \ IF CVT$$(D$,2%)='' THEN 20100%
                ELSE L%=4% \ GOSUB 10100%
                ! Give brief delete directions and get doomed college's #.

1420    K%=NUM.OF.COLLEGES%(0%)-1%
        \ FOR I%=0% TO K%
          \ IF LEFT(COLLEGE$(I%),4%)<>D$ THEN 1450%
```

```
1430    D1$=CVT$$(MID(COLLEGE$(I%),5%,20%),128%)
        \ IF I%=K% THEN 1440%
                        ELSE COLLEGE$(I%)=COLLEGE$(K%)
                ! Find doomed college and replace it with the last
                ! college, (as long as last college isn't the doomed one.)

1440    COLLEGE$(K%)=''
        \ NUM.OF.COLLEGES%(0%)=K%
        \ PRINT JUMP$;T$;
        \ PRINT "College number ";CVT$$(D$,2%);", ";D1$;", has been deleted."
        \ SORTSWITCH%(0%)=1%
        \ SLEEP 3% \ GOTO 20100%
                ! (If the doomed college was the last one, just zero it.)
                ! Reset total & sort switch; print message.
1450    NEXT I%
        \ GOSUB 20200%
        \ GOTO 20100%
                ! Print message & return to menu if bogus college number.


1500    !
        !       CHANGE COLLEGE CHARACTERISTICS.
        !

1510    PRINT CLEARJUMP$
        \ PRINT "       Cnanging a college characteristic is accomplished"
        \ PRINT "       essentially by writing over whatever currently"
        \ PRINT "       exists for that characteristic.  You first need to"
        \ PRINT "       indicate what college needs to be changed, which"
        \ PRINT "       you do by specifying its college number.  Then"
        \ PRINT "       you select which characteristic you would like to"
        \ PRINT "       change from a menu.  After this, you enter the"
        \ PRINT "       new characteristic in the same way as you did the"
        \ PRINT "       old one."
                ! Give brief instructions for changing characteristics.

1520    PRINT \ PRINT
        \ PRINT "       What is the number of the college in which"
        \ INPUT "       you want to make a change";D$
        \ IF CVT$$(D$,2%)='' THEN 20100%
                ELSE L%=VAL(D$) \ L%=4% \ GOSUB 10100%
                \ I%=0% \ I%=I%+1% UNTIL LEFT(COLLEGE$(I%),4%)=D$
                        ! Input college # & find its location in file.
                        ! VAL is to trap illegal # errors.


1530    PRINT \ PRINT
        \ PRINT "       Here are the college characteristics you can change:"
        \ PRINT
        \ PRINT "       1. College Number                9. Sex Code"
        \ PRINT "       2. College Name                 10. Affiliation"
        \ PRINT "       3. College Address              11. Admissions Codes"
        \ PRINT "       4. Zip Code                     12. Costs"
        \ PRINT "       5. Telephone Number             13. Financial Aids"
        \ PRINT "       6. Location                     14. Special Programs"
        \ PRINT "       7. Type of Community            15. Majors"
        \ PRINT "        8. Enrollment                  16. Sports"
                ! Give menu for making changes.

1540    PRINT
        \ INPUT "       Please type the number representing your choice";D$
        \ CHOICE%=VAL(FNFORMATINPUT2$(D$))
        \ IF CHOICE%<0% OR CHOICE%>16% THEN 1530%
                ELSE IF CHOICE%=0% THEN 20100%
                ELSE GOTO 1560% IF CHOICE%>8%
                        ! Evaluate choice, back to menu if <cr>.

1550    ON CHOICE% GOTO 1580%,1590%,1600%,1610%,1620%,1630%,1640%,1650%
                !        #,  Name, Addr., Zip, Phone, Loc., Comm., Enroll.

1560    ON CHOICE%-8% GOTO 1660%,1670%,1680%,1690%,1700%,1710%,1750%,1800%
                !          Sex, Affil, Admis, Cost, Aids, Prog, Major, Sport


1580    BYTE%=1% \ LONG%=4%
        \ GOSUB 11050% \ GOSUB 10200% \ GOSUB 11100%
        \ SORTSWITCH%(0%)=1% \ GOTO 1850%
                ! Set byte # & length, break up college string, input
                ! new college number, reassemble college string, set
                ! switch, & exit.  Lines 1590-1730 operate similarly.

1590    BYTE%=5% \ LONG%=20%
        \ GOSUB 11050% \ GOSUB 10250% \ GOSUB 11100%
        \ SORTSWITCH%(0%)=1% \ GOTO 1850%
                ! Change name.

1600    BYTE%=25% \ LONG%=20%
        \ GOSUB 11050% \ GOSUB 10300% \ GOSUB 11100% \ GOTO 1850%
                ! Change address.

1610    BYTE%=45% \ LONG%=5%
        \ GOSUB 11050% \ GOSUB 10350% \ GOSUB 11100% \ GOTO 1850%
                !Change zip code.

1620    BYTE%=50% \ LONG%=13%
        \ GOSUB 11050% \ GOSUB 10400% \ GOSUB 11100% \ GOTO 1850%
                ! Change phone #.

1630    BYTE%=63% \ LONG%=2%
        \ GOSUB 11050% \ GOSUB 10450% \ GOSUB 11100% \ GOTO 1850%
                ! Change location code.

1640    BYTE%=65% \ LONG%=1%
        \ GOSUB 11050% \ GOSUB 10500% \ GOSUB 11100% \ GOTO 1850%
                ! Change community code.

1650    BYTE%=66% \ LONG%=1%
        \ GOSUB 11050% \ GOSUB 10550% \ GOSUB 11100% \ GOTO 1850%
                ! Change enrollment code.

1660    BYTE%=67% \ LONG%=1%
        \ GOSUB 11050% \ GOSUB 10600% \ GOSUB 11100% \ GOTO 1850%
                ! Change sex code.
```

```
1670    BYTE%=68% \ LONG%=4%
        \ GOSUB 11050% \ GOSUB 10650% \ GOSUB 11100% \ GOTO 1850%
                ! Change affiliation code.

1680    BYTE%=72% \ LONG%=9%
        \ GOSUB 11050% \ GOSUB 10700% \ GOSUB 11100% \ GOTO 1850%
                ! Change admissions codes.

1690    BYTE%=81% \ LONG%=4%
        \ GOSUB 11050% \ GOSUB 10750% \ GOSUB 11100% \ GOTO 1850%
                ! Change cost codes.

1700    BYTE%=85% \ LONG%=5%
        \ GOSUB 11050% \ GOSUB 10800% \ GOSUB 11100% \ GOTO 1850%
                ! Change financial aids.

1710    BYTE%=90% \ LONG%=8%
        \ GOSUB 11050% \ GOSUB 10850% \ GOSUB 11100% \ GOTO 1850%
                ! Change special programs.


1750    PRINT \ PRINT
        \ PRINT "       In which category of majors do you wish to"
        \ PRINT "       make a change:" \ PRINT
        \ FOR J%=0% TO 5%
          \ PRINT "     ";FNFORMATOUTPUT$(J%+1%);". ";AREA$(J%);
          \ PRINT TAB(39%);FNFORMATOUTPUT$(J%+7%);". ";AREA$(J%+6%)
        \ NEXT J%
                ! Print menu for categories of majors.

1760    PRINT
        \ INPUT "       Please type the number of your category choice";D$
        \ CHOICE%=VAL(FNFORMATINPUT2$(D$))
        \ IF CHOICE%<0% OR CHOICE%>12% THEN 1750%
                ELSE IF CHOICE%=0% THEN 20100%
                        ! Evaluate choice, back to menu if <cr>.

1770    MAJORAREA%=CHOICE%-1%
        \ BYTE%=BYTE%(MAJORAREA%) \ LONG%=NUMINAREA%(MAJORAREA%)+1%
        \ GOSUB 11050% \ START%, FINISH%=MAJORAREA%
        \ GOSUB 10900% \ GOSUB 11100% \ GOTO 1850%
                ! Set loop limits for majors input routine (10900) so that
                ! it only does one category.  Disassemble/Assemble as usual.


1800    PRINT \ PRINT
        \ PRINT "       In which category of sports do you wish to"
        \ PRINT "       make a change:" \ PRINT
        \ PRINT "               1.  Intercollegiate"
        \ PRINT "               2.  Intramural"
                ! Print menu for categories of sports.

1810    PRINT
        \ INPUT "       Please type the number of your choice";D$
        \ CHOICE%=VAL(FNFORMATINPUT2$(D$))
        \ IF CHOICE%<0% OR CHOICE%>2% THEN 1800%
                ELSE IF CHOICE%=0% THEN 20100%
                        ! Evaluate choice, back to menu if <cr>.

1820    BYTE%=VAL(D$(CHOICE%+1%)) \ LONG%=15%
        \ GOSUB 11050% \ START%, FINISH%=CHOICE%-1%
        \ GOSUB 10950% \ GOSUB 11100%
                ! Set loop limits for sports input routine (10950) so that
                ! it only does one category.  Disassemble/Assemble as usual.


1850    PRINT JUMP$
        \ INPUT "       Do you want to make any other changes anywhere";D$
        \ D$=FNFORMATINPUT1$(D$)
        \ IF D$<>'Y' THEN 20100%
                ELSE PRINT
                \ INPUT "       For the same college";D$
                \ D$=FNFORMATINPUT1$(D$)
                \ IF D$<>'Y' THEN 1520% ELSE 1530%
                   ! Check for more changes for same or different college.


1900    !
        !       LIST COLLEGES & NUMBERS
        !

1910    IF SORTSWITCH%(0%)<>0% THEN PRINT JUMP$
        \ PRINT "       My records indicate that the file is in need"
        \ PRINT "       of sorting.  I can sort the file before I list"
        \ PRINT "       it (though that may take some time).  Do you want"
        \ INPUT "       me to go ahead with that procedure now";D$
        \ D$=FNFORMATINPUT1$(D$)
        \ IF D$<>'Y' THEN PRINT
                \ PRINT  "      Would you like the list printed even though"
                \ INPUT "       it won't be in order";D$
                \ D$=FNFORMATINPUT1$(D$)
                \ IF D$<>'Y' THEN 20100% ELSE GOSUB 20250%
                        \ GOTO 1980%
                ! Check if file needs ordering.  If so, give option to order
                ! it before printing or to list it unordered.

1920    PRINT JUMP$
        \ PRINT "       Would you like the colleges and numbers listed:"
        \ PRINT
        \ PRINT "               1. In order of college number."
        \ PRINT "               2. In alphabetical order."
                ! Give listing menu.

1930    PRINT
        \ INPUT "       Please type the number of your choice";D$
        \ CHOICE%=VAL(FNFORMATINPUT2$(D$))
        \ IF CHOICE%<0% OR CHOICE%>2% THEN 1920%
                ELSE IF CHOICE%=0% THEN 20100%
                        ! Evaluate choice, back to menu if <cr>.
```

```
1940    PRINT \ PRINT
        \ PRINT '       Would you like the "last edited" dates for the'
        \ INPUT "       colleges included on the list";D$
        \ EDDATE$=FNFORMATINPUT1$(D$)
        \ IF EDDATE$<>'Y' THEN EDDATE$='N'
                ! See if edit dates should be included on the list.

1950    GOSUB 20250%
        \ IF SORTSWITCH%(0%)=0% THEN ON CHOICE% GOTO 1980%, 1990%
          ELSE GOSUB 11150% IF LEFT(COLLEGE$(I%),4%)<LEFT(COLLEGE$(J%),4%)
                FOR J%=0% TO I%-1%   FOR I%=0% TO NUM.OF.COLLEGES%(0%)-1%
1960    FILEPOS%(I%)=I% FOR I%=0% TO NUM.OF.COLLEGES%(0%)-1%
        \ GOSUB 11200%
        IF MID(COLLEGE$(FILEPOS%(I%)),5%,20%)<MID(COLLEGE$(FILEPOS%(J%)),5%,20)
                FOR J%=0% TO I%-1%   FOR I%=0% TO NUM.OF.COLLEGES%(0%)-1%
1970    SORTSWITCH%(0%)=0%
        \ IF CHOICE%=2% THEN 1990%
                ! Bubble sort all COLLEGE$()'s on basis of college number,
                ! then bubble sort FILEPOS%() array to store proper order
                ! for alpha list, and finally clear sort switch.

1980    PRINT #2%, TAB(29%);"Listing by College Number"
        \ GOSUB 11250%
        \ FOR I%=0% TO NUM.OF.COLLEGES%(0%)-1%
                \ J%=I% \ GOSUB 11300%
        \ NEXT I%
        \ GOSUB 20300%
        \ GOTO 20100%
                ! Print colleges in numerical order, & dates if requested.
                ! Print space & if needed, KB message, before return to menu.


1990    PRINT #2%, TAB(33%);"Alphabetical Listing"
        \ GOSUB 11250%
        \ FOR I%=0% TO NUM.OF.COLLEGES%(0%)-1%
                \ J%=FILEPOS%(I%) \ GOSUB 11300%
        \ NEXT I%
        \ GOSUB 20300%
        \ GOTO 20100%
                ! Print colleges in alpha order, & dates if requested.
                ! Print space before going back to menu.


2000    !
        !       LIST MAJORS, SPORTS, ETC. THAT "CHOOSE" INCLUDES.
        !

2010    GOSUB 20250%
        \ PRINT #2%, TAB(27%);"List of Items Used and Stored"
        \ PRINT #2%, TAB(27%);"-----------------------------"
        \ PRINT #2%
        \ PRINT #2%, "  College Number"
        \ PRINT #2%, "  College Name"
        \ PRINT #2%, "  College Address"
        \ PRINT #2%, "  Zip Code"
        \ PRINT #2%, "  Telephone Number" \ PRINT #2%
        \ PRINT #2%, "  General Location"
        \ PRINT #2%, "  Type of Community"
        \ PRINT #2%, "  Enrollment"
        \ PRINT #2%, "  Sex"
        \ PRINT #2%, "  Affiliation" \ PRINT #2%
        \ PRINT #2%, "  Admissions Criteria:"
        \ PRINT #2%, "          Selectivity"
        \ PRINT #2%, "          Tests Required"
        \ PRINT #2%, "          Application Deadline" \ PRINT #2%
        \ PRINT #2%, "  Costs:"
        \ PRINT #2%, "          Comprehensive In-State Cost"
        \ PRINT #2%, "          Comprehensive Out-of-State Cost"
        \ PRINT #2% \ PRINT #2%, "      Types of Financial Aid:"
        \ PRINT #2%, T$;T$;FNCAPITAL$(FINAID$(J%)) FOR J%=0% TO 4%
        \ PRINT #2% \ PRINT #2%, "      Special Programs and Services:"
        \ PRINT #2%, T$;T$;FNCAPITAL$(SPPROG$(J%)) FOR J%=0% TO 7%
        \ PRINT #2% \ PRINT #2%, "      College Majors:"
        \ FOR J%=0% TO 11%
          \ PRINT #2% \ PRINT #2%, T$;T$;AREA$(J%);":"
            \ PRINT #2%, T$;T$;"   ";FNCAPITAL$(MAJOR$(J%,J1%))
                FOR J1%=0% TO NUMINAREA%(J%)-1%
        \ NEXT J% \ PRINT #2%
        \ PRINT #2%, "  Intercollegiate Sports:"
        \ PRINT #2%, T$;T$;FNCAPITAL$(SPORT$(J%)) FOR J%=0% TO 13%
        \ PRINT #2% \ PRINT #2%, "      Intramural Sports:"
        \ PRINT #2%, T$;T$;FNCAPITAL$(SPORT$(J%)) FOR J%=0% TO 13%
        \ GOSUB 20300%
        \ GOTO 20100%
                ! Print out list of items stored so that users can see
                ! what's coming, and so counselors can use it for
                ! pre-coding colleges they intend to add to the file.


2100    !
        !       DUMP THE FILE FOR DEBUGGING.
        !

2110    PRINT \ PRINT
        \ PRINT "       NUM.OF.COLLEGES%(0%) =";NUM.OF.COLLEGES%(0%)
        \ PRINT \ PRINT
        \ PRINT COLLEGE$(I%);CHR$(10%);CHR$(10%)
                FOR I%=0% TO NUM.OF.COLLEGES%(0%)-1%
        \ SLEEP 6% \ GOTO 20100%
                ! Simple file dump for debugging purposes.


10000   !


        !       P R O G R A M   S U B R O U T I N E S


10100   D$=FNFORMATINPUT2$(D$)
```

```
        \ IF LEN(D$)>=L% THEN D$=LEFT(D$,L%) ELSE D$=SPACE$(L%-LEN(D$))+D$
10110   RETURN
                ! Formats input, cuts it off or adds preceeding
                ! spaces as necessary--(used for numbers).

10150   COLLEGE$(K%)=COLLEGE$(K%)+D$
        \ RETURN
                ! Adds new piece of a college's data to its file string.

10200   INPUT " College Number:  ";D$
        \ L%=4% \ GOSUB 10100% \ RETURN

10250   INPUT " College Name:  (Max. 20 chars.)";D$
        \ L%=20% \ GOSUB 20150% \ RETURN

10300   PRINT " College address:  [as City, ST with max=20 chars.]";
        \ L%=20% \ INPUT LINE D$ \ GOSUB 20150% \ RETURN

10350   INPUT " Zip Code:  ";D$
        \ L%=5% \ GOSUB 10100% \ RETURN

10400    INPUT "        Telephone:  [as (xxx)xxx-xxxx] ";D$
        \ L%=13% \ GOSUB 10100% \ RETURN

10450   INPUT " Location Code:  (NE, MA, GL, PL, SE, SW, FW, RK, or OT) ";D$
        \ D$=FNFORMATINPUT2$(D$)
        \ IF LEN(D$)=2% THEN RETURN
                ELSE PRINT BOGUS$ \ GOTO 10450%

10500   INPUT ' "Type of Community" Code:  (U, S, R, or C) ';D$
        \ D$=FNFORMATINPUT2$(D$)
        \ IF LEN(D$)=1% THEN RETURN
                ELSE PRINT BOGUS$ \ GOTO 10500%

10550   INPUT " Undergraduate Enrollment Code:  (S, M, L, X) ";D$
        \ D$=FNFORMATINPUT2$(D$)
        \ IF LEN(D$)=1% THEN RETURN
                ELSE PRINT BOGUS$ \ GOTO 10550%

10600   INPUT " Sex code:  (M, F, B)";D$
        \ D$=FNFORMATINPUT2$(D$)
        \ IF LEN(D$)=1% THEN RETURN
                ELSE PRINT BOGUS$ \ GOTO 10600%

10650   PRINT " Affiliation Code:  (PUB, PRIV, CATH, BAPT,"
        \ INPUT "               JEW, LDS, LUTH, METH, PRES, UCC, or OTH) ";D$
        \ L%=4% \ GOSUB 20150%
        \ RETURN


10700   PRINT " Admissions Characteristics Codes:"
        \ INPUT "                  Selectivity Code:  (M, V, C, L, or N)";D1$
        \ D1$=FNFORMATINPUT1$(D1$)
        \ PRINT "                  Test Code:"
        \ PRINT T$; FOR J%=1% TO 3%
        \ INPUT "(SAT, ACT, S/A, A/S, A=S, S+T, [illegible]ON)";D$
        \ L%=3% \ GOSUB 20150%
        \ D1$=D1$+D$
        \ PRINT "                  Application Deadline for Fall Term:"
        \ PRINT T$; FOR J%=1% TO 3%
        \ INPUT "(Please type MONTH/DATE, e.g. 2/15, or NONE)";D$
        \ D$=FNFORMATINPUT2$(D$)
        \ D%=INSTR(1%,D$,"/")
        \ IF D$='NONE' THEN D$=D$+' '
                ELSE IF D%=0% OR LEN(D$)<3% THEN PRINT BOGUS$
                \ GOTO 10700%
10710   IF LEN(D$)=5% THEN 10730%
                ELSE IF LEN(D$)=4% THEN IF D%=2% THEN D$="0"+D$
                \ GOTO 10730%
10720   IF LEN(D$)=4% THEN D$=LEFT(D$,3%)+'0'+RIGHT(D$,4%)
                ELSE D$='0'+LEFT(D$,2%)+'0'+RIGHT(D$,3%)
10730   D$=D1$+D$ \ RETURN
                ! Assemble admissions characteristics string.


10750   PRINT " Cost Codes:  (1, 2, 3, 4, 5, ...)"
        \ INPUT "                  In-state overall cost code";D$
        \ D%=VAL(D$)
        \ IF LEN(D$)=1% THEN D$='0'+D$
                ELSE IF LEN(D$)=2% THEN 10760
                ELSE PRINT BOGUS$ \ GOTO 10750%
10760    D1$=D$
        \ INPUT "                  Out-of-state overall cost code";D$
        \ D%=VAL(D$)
        \ IF LEN(D$)=1% THEN D$='0'+D$
                ELSE IF LEN(D$)=2% THEN 10770%
                ELSE PRINT BOGUS$ \ GOTO 10750%
10770   D$=D1$+D$ \ RETURN
                ! Check & assemble cost coding figures.  VAL gets illegal #'s.


10800   PRINT " Financial Aid Codes:"
        \ PRINT "        (Please answer with YES/NO or Y/N; 'RETURN'=No.)"
        \ D$=''
        \ FOR J%=0% TO 4%
                \ PRINT T$;T$;"Does this college offer ";FINAID$(J%);
                \ INPUT D1$ \ D1$=FNFORMATINPUT1$(D1$)
                \ IF D1$<>'Y' THEN D1$='N'
10810   D$=D$+D1$
        \ NEXT J% \ RETURN
```

```
                ! Assemble yes/no string for types of finanicial aid.


10850   PRINT " Special Programs and Services Codes:"
        \ PRINT "       (Please answer with YES/NO or Y/N; 'RETURN'=No.)"
        \ D$=''
        \ FOR J%=0% TO 7%
                \ PRINT "            Does this college offer ";SPPROG$(J%);
                \ INPUT D1$ \ D1$=FNFORMATINPUT1$(D1$)
                \ IF D1$<>'Y' THEN D1$='N'
10860   D$=D$+D1$
        \ NEXT J% \ RETURN
                ! Assemble yes/no string for types of special programs.


10900   PRINT ' "Academic Majors" Codes:' \ D$=''
        \ FOR J%=START% TO FINISH% \ PRINT
          \ PRINT "            Does this college offer any majors in ";
          \ PRINT AREA$(J%);
          \ INPUT D1$
          \ D1$=FNFORMATINPUT1$(D1$)
          \ IF D1$='Y' THEN 10910%
                ELSE D1$=''
                \ D1$=D1$+'N' FOR J1%=0% TO NUMINAREA%(J%)
                \ GOTO 10930%
10910     PRINT "            Specifically, does it offer:"
          \ FOR J1%=0% TO NUMINAREA%(J%)-1%
                \ PRINT "                  Major(s) in ";MAJOR$(J%,J1%);
                \ INPUT D2$
                \ D2$=FNFORMATINPUT1$(D2$)
                \ IF D2$<>'Y' THEN D2$='N'
10920     D1$=D1$+D2$
          \ NEXT J1%
10930   D$=D$+D1$
        \ NEXT J%
        \ RETURN
                ! Assemble college major code string with J% loop for
                ! specific majors within the I1% loop of general academic
                ! categories.


10950   PRINT " Sports Codes:" \ D$=''
        \ FOR J%=START% TO FINISH% \ PRINT
          \ PRINT "            Does this college offer any ";
          \ PRINT D$(J%);" sports";
          \ INPUT D1$
          \ D1$=FNFORMATINPUT1$(D1$)
          \ IF D1$='Y' THEN 10960%
                ELSE D1$=''
                \ D1$=D1$+'N' FOR J1%=0% TO 14%
                \ GOTO 10980%
10960     PRINT "            Specifically, does it offer:"
          \ FOR J1%=0% TO 13%
                \ PRINT "                  I";RIGHT(D$(J%),2%);" ";
                \ PRINT SPORTS$(J1%);
                \ INPUT D2$
                \ D2$=FNFORMATINPUT1$(D2$)
                \ IF D2$<>'Y' THEN D2$='N'
10970       D1$=D1$+D2$
          \ NEXT J1%
10980   D$=D$+D1$
        \ NEXT J%
        \ RETURN
                ! Assemble interscholastic/intramural code string.


11000   D$=CVT$$(RIGHT(DATE$(0%),4%),32%)
        \ RETURN
                ! Pick month & year off today's date, and store it
                ! on the college record as the record edit date.


11050   HALFONE$=LEFT(COLLEGE$(I%),BYTE%-1%)
        \ D$=MID(COLLEGE$(I%),BYTE%,LONG%)
        \ HALFTWO$=RIGHT(COLLEGE$(I%),BYTE%+LONG%)
        \ PRINT
        \ PRINT '       That item now reads:  "';D$;'"'
        \ PRINT
        \ PRINT "       In the same manner as you did when you first"
        \ PRINT "       built the college file, please enter the new"
        \ RETURN
                ! Save the two halves of the college string not involved
                ! with the change, and set up for the input subroutine.


11100   COLLEGE$(I%)=HALFONE$+D$+HALFTWO$
        \ GOSUB 11000%
        \ COLLEGE$(I%)=LEFT(COLLEGE$(I%),LEN(COLLEGE$(I%))-6%)+D$
        \ RETURN
                ! Reassemble the newly changed college string
                ! and revise the edit date.
                ! NOTE:  LEN(COLLEGE$(I%)) should always be 230 in
                !        this configuration.


11150   D$=COLLEGE$(I%) \ COLLEGE$(I%)=COLLEGE$(J%)
        \ COLLEGE$(J%)=D$ \ RETURN
                ! Switching used in file bubble sort.


11200   D$=FILEPOS$(I%) \ FILEPOS$(I%)=FILEPOS$(J%)
        \ FILEPOS$(J%)=D$ \ RETURN
                ! Switching in key file, used in alphabetizing.


11250   PRINT #2% \ PRINT #2%
        \ PRINT #2%, TAB(9%);"College";TAB(25%);"College";TAB(50%);"College";
        \ IF EDDATE$='Y' THEN PRINT #2%, TAB(70%);"Last"
                ELSE PRINT #2%
11260   PRINT #2%, TAB(9%);"Number";TAB(27%);"Name";TAB(50%);"Address";
```

```
        \ IF EDDATE$='Y' THEN PRINT #2%, TAB(70%);"Edit"
                ELSE PRINT #2%
11270   PRINT #2%, TAB(9%);"--------";TAB(25%);"--------";TAB(50%);"--------";
        \ IF EDDATE$='Y' THEN PRINT #2%, TAB(70%);"----"
                ELSE PRINT #2%
11280   PRINT #2%
        \ RETURN
                ! Print header for both numerical & alpha listings.


11300   PRINT #2%, TAB(10%);LEFT(COLLEGE$(J%),4%);
                        TAB(19%);MID(COLLEGE$(J%),5%,20%);
                        TAB(44%);MID(COLLEGE$(J%),25%,20%);
                \ IF EDDATE$='Y' THEN PRINT #2%,
                        TAB(69%);RIGHT(COLLEGE$(J%),225%)
                                ELSE PRINT #2%
11310   RETURN
                ! Printing routine for both numerical & alpha listings.


19000   !

        !       E R R O R - H A N D L I N G


19010   ON ERROR GOTO 19000%
                ! Reset error trap.

19020   IF ERR=52% THEN PRINT
        \ PRINT BOGUS$ \ PRINT
        \ IF ERL=1130% THEN RESUME 20100%
                ELSE IF ERL=1520% THEN RESUME 1520%
                ELSE IF ERL=1540% THEN RESUME 1530%
                ELSE IF ERL=1760% THEN RESUME 1750%
                ELSE IF ERL=1810% THEN RESUME 1800%
                ELSE IF ERL=1920% THEN RESUME 1910%
                ELSE IF ERL=10750% OR ERL=10760% THEN RESUME 10750%
                ELSE RESUME 20100%
                ! Illegal number errors.

19030   IF ERR=50% THEN PRINT BOGUS$ \ RESUME
                ! Data format errors.

19040   IF ERR=55% AND ERL=1520% THEN GOSUB 20200% \ RESUME 20100%
                ! Bogus college # to change => message & back to menu.

19050   IF ERR=28% THEN RESUME 32710%
                ! Trap ^C and exit.

19060   IF ERR=8% THEN PRINT
        \ PRINT "       That device is not available right now."
        \ PRINT \ RESUME 20250%
                ! Device not available error.
```

```
19070   PRINT \ PRINT
        \ PRINT "       Please tell the computer staff that there is an"
        \ PRINT "       Error Number";ERR;"at Line Number";ERL;"."
        \ SLEEP 3% \ PRINT \ PRINT
        \ RESUME 20100%
                ! Print number & location of error, return to menu.


20000   !


        !       S T A N D A R D   S U B R O U T I N E S


20100   PRINT \ PRINT \ PRINT
        \ INPUT "       Main Option:  (Hit 'RETURN' to get list) ";D$
        \ D$=FNFORMATINPUT2$(D$)
        \ GOTO 1130%
                ! Short-hand for full menu.


20150   D$=FNFORMATINPUT3$(D$)
        \ IF LEN(D$)>=L% THEN D$=LEFT(D$,L%) ELSE D$=D$+SPACE$(L%-LEN(D$))
20160   RETURN
                ! Formats input, cuts it off or adds following
                ! spaces as necessary--(used for words).


20200   PRINT JUMP$
        \ PRINT "       I cannot find the college number that you"
        \ PRINT "       specified listed in the file anywhere.  Please"
        \ PRINT "       refer to a list of the colleges and their"
        \ PRINT "       numbers, and try again."
        \ PRINT JUMP$ \ SLEEP 4% \ RETURN
                ! Message for bogus college number.


20250   PRINT
        \ INPUT "       Output to:  ('RETURN' = this terminal) ";KB$
        \ IF CVT$$(KB$,2%)='' THEN KB$="KB:"
                ! Allow printer or file to receive finished list.
20260   OPEN KB$ AS FILE 2%
        \ PRINT
        \ INPUT "       Pause";D$
        \ PRINT #2%, JUMP$
        \ PRINT #2%, TAB(25%);"CHOOSE College Selection Program"
        \ PRINT #2% \ PRINT #2%
        \ RETURN
                ! Output to, pause for paper, & print header.


20300   PRINT #2%, JUMP$ FOR J%=1% TO 3%
        \ IF KB$="KB:" THEN SLEEP 2%
                ELSE PRINT JUMP$
                \ PRINT "       The list has been sent to ";CVT$$(KB$,32%);"."
                \ SLEEP 2%
```

```
20310   RETURN
                ! Print space after listing, & if different KB,
                ! send completion message.

27000   !

        !       S T A N D A R D   F U N C T I O N S

27100   DEF FNFORMATINPUT1$(D$)=LEFT(CVT$$(D$,34%),1%)
                ! Kill any input spaces, capitalize,
                ! and return leftmost character.

27150   DEF FNFORMATINPUT2$(D$)=CVT$$(D$,34%)
                ! Kill input spaces & capitalize.

27200   DEF FNFORMATINPUT3$(D$)=CVT$$(D$,188%)
                ! Discard excess characters & capitalize.

27250   DEF FNFORMATOUTPUT$(D%)=CVT$$(NUM$(D%),2%)
                ! Strips spaces usually printed with a number.

27300   DEF FNCAPITAL$(D$)=CVT$$(LEFT(D$,1%),32%)+RIGHT(D$,2%)
                ! Capitalizes first letter in phrase.

32700   !

        !       P R O G R A M   C O M P L E T I O N

32710   CLOSE I% FOR I%=1% TO 12%
        \ PRINT JUMP$;"          Glad to be of service.";JUMP$
        \ NO EXTEND
                ! Close all I/O channels, print closing, & end extend.

32767   END
```

CHOOSE COLLEGE SELECTION PACKAGE

CHOOSE.BAS Program Listing

by

Kenneth A. Colburn

Proctor Academy
Andover, New Hampshire 03216

```
1
        !
        !       CHOOSE.BAS

2!              PROGRAM         : CHOOSE.BAS
3!              PACKAGE         : CHOOSE College Selection Package
5!              VERSION         : V01
6!              EDIT            : 01
7!              EDIT DATE       : 6/30/80
8!
9!              AUTHOR          : Kenneth A. Colburn
                                  Proctor Academy
                                  Andover, NH  03216
10              EXTEND

11      !

        !          C O P Y R I G H T   N O T I C E

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!                     Proctor Academy, Andover, NH.
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!       program or related material, and no responsibility
!       is assumed in connection therewith.


20      !

        !       M O D I F I C A T I O N   H I S T O R Y


!       VERSION/EDIT            EDIT DATE       REASON


100     !
```

```
        !       G E N E R A L   D E S C R I P T I O N

!       CHOOSE.BAS, the central program of the CHOOSE College Selection
!       Package, comprises a minimal direct inquiry computer-assisted
!       guidance system designed to aid the high school student in
!       isolating colleges appropriate to his or her needs.  By
!       successively specifying the characteristics of his or her
!       ideal college, the student reduces the number of qualifying
!       colleges to a manageable number.  This program operates on
!       the COLLEG.FIL college file, which is built and maintained
!       using the MAINT.BAS program.  All CHOOSE Package programs
!       conform to DEC BASIC-PLUS programming conventions (STD-A001).
!       For further information, see the "CHOOSE System Manager's
!       Guide", the "CHOOSE Counselor's Guide", and the "CHOOSE
!       Student's Guide."

300     !

        !       I / O   C H A N N E L S

!       CHANNEL #:              USED FOR:
!          1                    College file (COLLEG.FIL).
!          2                    Outputing lists to printer or file.


400     !

        !       V A R I A B L E   D E F I N I T I O N   T A B L E

!       NAME:                   USED FOR:
!       AREA$()                 General academic areas.
!       BOGUS$                  Response to bad input.
!       BYTE%                   Starting byte for accessing subsections.
!       BYTE%()                 Starting byte for accessing subsections.
!       CHOICE%                 Menu selection.
!       CLEARJUMP$              Clear screen and form feed.
!       COLLEGE$()              Virtual college data string (2 coll./block).
!       CRLF$                   <cr> + <lf>.
!       D$                      Utility string.
!       D$()                    Utility string array for sports info.
!       D%                      Utility integer.
!       D1%                     Utility integer.
!       ERL                     Standard error line.
!       ERR                     Standard error type.
!       FILEPOS%()              Alpha list position. (Used in MAINT.BAS.)
!       FINAID$()               Financial aid types.
!       I$                      Version/Edit
!       I%                      Loop variable.
!       INIT%                   Switch to insure initialization.
!       J%                      Loop variable.
!       J1%                     Loop variable.
!       JUMP$                   Form feed.
!       K%                      Utility variable for # of qualifying colleges.
!       KB$                     Output location for lists.
!       L%                      Utility variable for field length.
!       LONG%                   Length for accessing subsection or field.
!       MAJOR$(,)               Specific majors within general areas.
!       NUM.OF.COLLEGES%()      Virtual storage of # of colleges on file.
!       NUMINAREA%()            Number of majors in an academic area.
!       NUMSPECS%               Number of specifications in use.
!       OLDK%                   Number of qualifying colleges last round.
!       OLDQUAL%()              File positions of last round qualifiers.
!       QUAL%()                 File positions of present qualifiers.
!       S$                      Utility string for storing specifications.
!       SORTSWITCH%()           Sort status of file (0-ok, 1-needs sorting).
!       SPEC$()                 Specifications-in-use array.
!       SPORT$()                Specific sports offered.
!       SPPROG$()               Specific special programs offered.
!       T$                      Horizontal tab.
!       TWODELETE%              Switch to prevent successive spec. deletions.


800     !

        !       F U N C T I O N / S U B R O U T I N E   D E S C.


810     !

        !       S U B R O U T I N E S

!       LINE:           USE:
!       10100           Formats input & checks for <cr>.
!       10150           Stores new spec. & shifts qualifying arrays.
!       10200           General check-if-qualifies routine.
!       10250           Check-if-qualifies routine for costs.
!       10300           Check-if-qualifies routine for deadline.
!       10350           Tell number of colleges qualifying.
!       10400           Zero arrays & counters for restart.
!       10450           Variable header for some specifications.
!       20100           Short-hand menu input.
!       20150           Formats and truncates/fills fields.
!       20200           Error message for bad college number.
!       20250           Handles output to, pause, & general header.
!       20300           Returns message to KB: if output file is different.

820     !
```

```
        !     F U N C T I O N S

!       NAME:                     LINE:          USE:
!       FNFORMATINPUT1$           27100          Takes one letter from input.
!       FNFORMATINPUT2$           27150          Capitalizes & crunches input.
!       FNFORMATINPUT3$           27200          Formats line input.
!       FNFORMATOUTPUT$           27250          Strips spaces from printed #.
!       FNCAPITAL$                27300          Capitalizes first letter.

900     !

        !     D I M E N S I O N   S T A T E M E N T S


910     DIM#1%, NUM.OF.COLLEGES%(0%), SORTSWITCH%(0%), FILEPOS%(20%),
                COLLEGE$(20%)=256%
                ! Number of colleges stored, whether the file is in a
                ! sorted state, array of file position for alpha list,
                ! and the college's info in packed string form.

920     DIM FINAID$(4%), SPPROG$(7%), AREA$(11%), NUMINAREA%(11%),
                BYTE%(11%), MAJOR$(11%,13%), SPORT$(14%)
                ! Financial aids, special programs, fields of study, number
                ! of specific majors within those fields, where they start
                ! on the record, names of the specific majors themselves,
                ! and sports offered.

930     DIM OLDQUAL%(20%), QUAL%(20%), SPEC$(24%)=64%
                ! Arrays for sifting out colleges.
        !
        ! Non-file arrays are generated each time.  They could be done
        ! instead with a dummy file or a separate chaining program.
        !
        ! To increase file dimensions to include more colleges,
        ! increase FILEPOS%() and COLLEGE$() dim's on line 910,
        ! and OLDQUAL%() and QUAL%() dim's on line 930.
        !

999     !

        !     M A I N   P R O G R A M   C O D E


1000    ON ERROR GOTO 19000%
                ! Set up standard error trap.

1010    I$="V01-01"+"            "+RIGHT(SYS(CHR$(6%)+CHR$(9%)+CHR$(0%)),3%)
                ! Set up header line; SYS call gets installation name.
```

```
1020    PRINT "CHOOSE   "+I$
                ! Print the header.

1030    D$=SYS(CHR$(6%)+CHR$(-7%))
                ! Enable ^C trapping.

1040    JUMP$=CHR$(12%)
        \ T$=CHR$(9%)
        \ CLEARJUMP$=CHR$(140%)+JUMP$
        \ CRLF$=CHR$(13%)+CHR$(10%)
        \ D$(0%)="intercollegiate" \ D$(1%)="intramural"
        \ D$(2%)="195" \ D$(3%)="210"
        \ BOGUS$=CRLF$+
           "    Bogus input or incorrect code.  Please check the"+CRLF$+
           "    CHOOSE Student's Guide and try again."+CRLF$
                ! Set up screen formatting and other constant variables.

1050    READ FINAID$(I%) FOR I%=0% TO 4%        ! Financial aid types.  &
        \ READ SPPROG$(I%) FOR I%=0% TO 7%      ! Special programs.     &
        \ FOR I%=0% TO 11%                      ! Categories of Study.  &
           \ READ AREA$(I%), NUMINAREA%(I%), BYTE%(I%)          &
           \ FOR J%=0% TO NUMINAREA%(I%)-1%
              \ READ MAJOR$(I%,J%)              ! Specific majors in    &
           \ NEXT J%                            ! the field.            &
        \ NEXT I%
        \ READ SPORT$(I%) FOR I%=0% TO 13%      ! Sports offered.       &
                ! Read in type names for use in loops later.

1060    DATA    "need-based scholarships",
                "Basic Educational Opportunity Grants",
                "work opportunities", "loans", "other types of aid",

                "advanced standing or credit by exam",
                "remedial or skill-building programs",
                "student designed majors", "independent study courses",
                "programs for study abroad", "work/study programs",
                "ROTC", "other special programs or services".

1070    DATA    "Agriculture", 6, 98,
                "Agriculture (general)", "Zoology/Animal Sciences",
                "Forest Sciences", "Botany/Plant Sciences",
                "Wildlife Sciences/Management", "other areas in Agriculture",

                "Business", 5, 105,
                "Administration/Commerce/Management (general)",
                "Accounting", "Finance/Banking",
                "Marketing/Purchasing", "other areas in Business",

                "Communications", 5, 111,
                "Communications (general)", "Advertising",
                "Journalism", "Radio/TV Broadcasting",
                "other areas in Communications",

                "Education", 7, 117,
                "Education (general)",
                 "Child Development/Pre-School Education",
                 "Elementary Education", "Physical Education",
                 "Secondary Education", "Special Education",
                 "other areas in Education",

                 "Engineering", 7, 125,
                 "Engineering (general)", "Chemical Engineering",
                 "Civil Engineering", "Electrical/Electronic Engineering",
                 "Industrial Engineering", "Mechanical Engineering",
                 "other areas in Engineering",

                 "Fine/Applied Arts", 9, 133,
                 "Art/Fine Arts (general)", "Architecture", "Art History",
                 "Dance", "Music", "Photography", "Studio Art",
                 "Theatre Arts/Drama", "other areas in Fine or Applied Arts",

                 "Foreign Languages", 7, 143,
                 "French", "German", "Italian", "Latin", "Spanish", "Russian",
                 "other Foreign Languages",

                 "Health Professions", 6, 151,
                 "Pre-Medicine", "Pre-Veterinary", "Medical Technology",
                 "Nursing", "Nutrition/Food Sciences", "Occupational Therapy",
                 "Physical Therapy", "other areas in the Health Professions",

                 "Humanities/Liberal Arts", 7, 160,
                 "Humanities/Liberal Arts (general)", "Creative Writing",
                 "English", "Literature", "Philosopy", "Religious Studies",
                 "other areas in the Humanities",

                 "Mathematics", 3, 168,
                 "Mathematics (general)", "Computer/Information Science",
                 "other areas in Mathematics",

                 "Science", 9, 172,
                 "Astronomy", "Biochemistry",
                 "Biology/Biological Sciences", "Chemistry",
                 "Ecology/Environmental Sciences", "Geology",
                 "Marine Sciences/Oceanography", "Physics",
                 "other areas in Science",

                 "Social Science", 12, 182,
                 "Social Science (general)", "Anthropology",
                 "Archaeology", "Area Studies/Geography",
                 "Economics", "History", "Human Services/Social Work",
                 "Pre-Law", "Political Science/Government", "Psychology",
                 "Sociology", "other areas in the Social Sciences"
1080     DATA    "Baseball", "Basketball", "Cross-Country Running",
                 "Football", "Ice Hockey", "Lacrosse", "Skiing",
                 "Soccer", "Swimming", "Tennis", "Track and Field",
                 "Volleyball", "Wrestling", "other sports"

1100     !
```

```
        !       I N T R O D U C T I O N   A N D   M A I N   M E N U

1110    PRINT CLEARJUMP$
        \ PRINT "       CHOOSE is a program that aids you in selecting a"
        \ PRINT "       college by determining which colleges satisfy"
        \ PRINT "       criteria that you specify.  Running this program a"
        \ PRINT "       number of times with varying sets of characteristics"
        \ PRINT "       can help you explore colleges and can increase your"
        \ PRINT "       awareness about choosing a college."
        \ PRINT
        \ PRINT '       Please see the "CHOOSE Student';"'s Guide";'" for'
        \ PRINT "       information about running this program."
        \ SLEEP 4%
        \ OPEN 'COLLEG.FIL' FOR INPUT AS FILE 1%
                ! Introduce the program.

1120    PRINT CLEARJUMP$
        \ PRINT "       The following options are available:"
        \ PRINT
        \ PRINT "                       1.  Add a college specification."
        \ PRINT "                       2.  Delete the last college specification."
        \ PRINT "                       3.  List active specifications."
        \ PRINT "                       4.  List qualifying colleges."
        \ PRINT "                       5.  List all the information for a college:"
        \ PRINT "                       6.  Start over."
        \ PRINT "                       7.  Exit from this program."
        \ PRINT \ PRINT
        \ INPUT "       Please type the number of your choice";D$
                ! Give menu.

1130    CHOICE%=VAL(FNFORMATINPUT1$(D$))
        \ IF CHOICE%<1% OR CHOICE%>7% THEN 1120% ELSE 1140%
                ! Input option choice.  If illegal, then repeat menu.

1140    ON CHOICE% GOTO 1200%, 1600%, 1700%, 1800%, 1900%, 2000%, 32700%
                !       Add     Delete List  Qualif List 1  Restart  Exit
                !       Spec    1 Spec Specs Colls  College


1200    !
        !       ADD A COLLEGE SPECIFICATION.
        !

1210    IF INIT%=0% THEN GOSUB 10400%
                ELSE IF NUMSPECS%=24% THEN PRINT
                \ PRINT T$;"The 25 specification maximum has been reached."
                \ PRINT T$;"Please delete one or start over."
                \ GOTO 20100%
                ! Initialize arrays if restart hasn't already occurred.
                ! Otherwise, check for maximum # of specs.

1220    PRINT JUMP$
        \ PRINT "       Here are the college characteristics you can specify:"
```

```
          \ PRINT
          \ PRINT "      1. Location                     7. Costs"
          \ PRINT "      2. Type of Community            8. Financial Aids"
          \ PRINT "      3. Enrollment                   9. Special Programs"
          \ PRINT "      4. Sex                         10. Majors"
          \ PRINT "      5. Affiliation                 11. Sports"
          \ PRINT "      6. Admissions Characteristics"
                  ! Give menu for making specifications.

1230      PRINT
          \ INPUT "       Please type the number of your choice";D$
          \ CHOICE%=VAL(FNFORMATINPUT2$(D$))
          \ IF CHOICE%<0% OR CHOICE%>11% THEN 1220%
                  ELSE IF CHOICE%=0% THEN 20100%
                  ELSE TWODELETE%=0%
          \ GOTO 1250% IF CHOICE%>5%
                          ! Evaluate choice; back to menu if <cr>, else
                          ! shift arrays & get on with comparison.

1240      ON CHOICE% GOTO 1260%, 1280%, 1300%, 1320%, 1340%
                  !       Loc,  Type, Enroll,  Sex,  Affil

1250      ON CHOICE%-5% GOTO 1350%, 1390%, 1410%, 1420%, 1430%, 1450%
                  !        Admiss, Costs, Aids, SpProgs, Majors, Sports


1260      BYTE%=63% \ LONG%=2%
          \ PRINT
          \ PRINT "       Please enter the Location Code that your college"
          \ PRINT "       must have:  (NE, MA, GL, PL, SE, SW, FW, RK,";
          \ INPUT " or OT)";D$
          \ GOSUB 10100%
                  \ IF LEN(D$)<>LONG% THEN PRINT BOGUS$ \ GOTO 1260%
1270      S$="Location Code:  "+D$
          \ GOSUB 10150% \ GOTO 10200%
                  ! Process location specification.


1280      BYTE%=65% \ LONG%=1%
          \ PRINT
          \ PRINT '       Please enter the "Type of Community" Code that'
          \ INPUT "       your college must have:  (U, S, R, or C) ";D$
          \ GOSUB 10100%
                  \ IF LEN(D$)<>LONG% THEN PRINT BOGUS$ \ GOTO 1280%
1290      S$='"Type of Community" Code:  '+D$
          \ GOSUB 10150% \ GOTO 10200%
                  ! Process community specification.


1300      BYTE%=66% \ LONG%=1%
          \ PRINT
          \ PRINT "       Please enter the Enrollment Code that your"
          \ INPUT "       college must have:  (S, M, L, X) ";D$
          \ GOSUB 10100%
                  \ IF LEN(D$)<>LONG% THEN PRINT BOGUS$ \ GOTO 1300%
1310      S$="Enrollment Code:  "+D$
```

```
        \ GOSUB 10150% \ GOTO 10200%
                ! Process enrollment specification.

1320    BYTE%=67% \ LONG%=1%
        \ PRINT
        \ PRINT "       Please enter the Sex Code that your college"
        \ INPUT "       must have:  (M, F, or B) ";D$
        \ GOSUB 10100%
                \ IF LEN(D$)<>LONG% THEN PRINT BOGUS$ \ GOTO 1320%
1330    S$="Sex Code:  "+D$
        \ GOSUB 10150% \ GOTO 10200%
                ! Process sex specification.

1340    BYTE%=68% \ L%, LONG%=4%
        \ PRINT
        \ PRINT "       Please enter the Affiliation Code that your"
        \ PRINT "       college must have:  (PUB, PRIV, CATH, BAPT,"
        \ INPUT "       JEW, LDS, LUTH, METH, PRES, UCC, or OTH) ";D$
        \ GOSUB 20150%
        \ IF CVT$$(D$,2%)='' THEN 1220%
                ELSE S$="Affiliation Code:  "+D$
        \ GOSUB 10150% \ GOTO 10200%
                ! Process affiliation specification.


1350    PRINT
        \ PRINT "       Do you want to specify Selectivity, Tests, or"
        \ INPUT "       Application Deadline: (S, T, or D) ";D$
        \ D$=FNFORMATINPUT1$(D$)
        \ IF D$<>'S' AND D$<>'T' AND D$<>'D' AND D$<>'A' THEN 1220%
                ELSE IF D$='T' THEN 1360%
                ELSE IF D$='D' OR D$='A' THEN 1370%
                ELSE PRINT
        \ PRINT "       Please enter the Selectivity Code that your"
        \ INPUT "       college must have:  (M, V, C, L, or N) ";D$
        \ D$=FNFORMATINPUT1$(D$)
        \ GOSUB 10100%
        \ BYTE%=72% \ LONG%=1%
        \ S$="Selectivity Code:  "+D$
        \ GOSUB 10150% \ GOTO 10200%
                ! Process selectivity specification.

1360    PRINT
        \ PRINT "       Please enter the code for tests that your college"
        \ INPUT "       must have:  (SAT, ACT, S/A, A/S, A=S, S+T, or NON) ";D$
        \ GOSUB 10100%
        \ BYTE%=73% \ LONG%=3%
        \ S$="Tests Code:  "+D$
        \ GOSUB 10150% \ GOTO 10200%
                ! Process tests specification.

1370    PRINT
        \ PRINT "       By specifying a deadline, you eliminate any colleges"
        \ PRINT "       whose fall term application deadline lies BEFORE the"
        \ PRINT "       date which you specify.  January 1st (1/1) is the"
        \ PRINT "       earliest possible deadline to specify."
        \ PRINT
        \ PRINT "       Please enter the deadline which you would like to"
        \ INPUT "       specify in the form:  MM/DD  (e.g., 1/15, or 3/27)";D$
        \ D%=INSTR(1%,D$,"/")
        \ IF CVT$$(D$,2%)='' THEN 1220%
                ELSE IF LEN(D$)<3% OR D%=0% THEN PRINT BOGUS$
                \ GOTO 1370%
                ! First half of deadline processing.

1380    D%=(VAL(LEFT(D$,D%-1%)))*100% + VAL(RIGHT(D$,D%+1%))
        \ BYTE%=76% \ LONG%=5%
        \ S$="Application Deadline:  "+D$
        \ GOSUB 10150% \ GOTO 10300%
                ! Second half of deadline processing.


1390    PRINT
        \ PRINT "       Want to specify In-State or Out-of-State Cost ";
        \ INPUT "(I or O) ";D$
        \ D$=FNFORMATINPUT1$(D$)
        \ IF D$<>'I' AND D$<>'O' THEN 1220%
                ELSE IF D$='O' THEN 1400%
                ELSE PRINT
        \ PRINT "       Please enter the In-State Cost Code that your"
        \ INPUT "       college must have:  (1, 2, 3, ...)";D$
        \ GOSUB 10100%
        \ D%=VAL(D$)
        \ BYTE%=81% \ LONG%=2%
        \ S$="In-State Cost:  < $"+CVT$$(NUM$(D%),2%)+",000"
        \ GOSUB 10150% \ GOTO 10250%
                ! Process In-State Cost specification.

1400    PRINT
        \ PRINT "       Please enter the Out-of-State Cost Code that"
        \ INPUT "       your college must have:  (1, 2, 3, ...) ";D$
        \ GOSUB 10100%
        \ D%=VAL(D$)
        \ BYTE%=83% \ LONG%=2%
        \ S$="Out-of-State Cost:  < $"+CVT$$(NUM$(D%),2%)+",000"
        \ GOSUB 10150% \ GOTO 10250%
                ! Process Out-of-State Cost specification.


1410    D$="type of financial aid" \ GOSUB 10450%
        \ PRINT "Here are the types"
        \ PRINT "       which you can specify:"
        \  PRINT
        \ PRINT T$;T$;FNFORMATOUTPUT$(J%+1%);". ";
                FNCAPITAL$(FINAID$(J%))  FOR J%=0% TO 4%
        \ PRINT \ LONG%=1%
        \ PRINT "       Please enter the number of a type of financial"
        \ INPUT "       aid that your college must offer";D%
        \ IF D%<1% OR D%>5% THEN 1220%
```

```
                ELSE BYTE%=85%+(D%-1%)
        \ S$=FNCAPITAL$(FINAID$(D%-1%))+" offered."
        \ D$='Y' \ GOSUB 10150% \ GOTO 10200%
                ! Process financial aid specification.


1420    D$="special program or service" \ GOSUB 10450%
        \ PRINT "Here are the programs"
        \ PRINT "       which you can specify:"
        \ PRINT
        \ PRINT T$;T$;FNFORMATOUTPUT$(J%+1%);". ";
                FNCAPITAL$(SPPROG$(J%))  FOR J%=0% TO 7%
        \ PRINT \ LONG%=1%
        \ PRINT "       Please enter the number of a special program"
        \ INPUT "       that your college must offer";D%
        \ IF D%<1% OR D%>8% THEN 1220%
                ELSE BYTE%=90%+(D%-1%)
        \ S$=FNCAPITAL$(SPPROG$(D%-1%))+" offered."
        \ D$='Y' \ GOSUB 10150% \ GOTO 10200%
                ! Process special program specification.


1430    D$="major or field of study" \ GOSUB 10450%
        \ PRINT "Here are the general"
        \ PRINT "       academic areas which you can specify:"
        \ PRINT
        \ PRINT T$;T$;FNFORMATOUTPUT$(J%+1%);". ";
                FNCAPITAL$(AREA$(J%)) FOR J%=0% TO 11%
        \ PRINT \ LONG%=1%
        \ PRINT "       Please enter the number of a general academic"
        \ INPUT "       area that your college must offer";D%
        \ IF D%<1% OR D%>12% THEN 1220%
                ELSE BYTE%=BYTE%(D%-1%)
        \ PRINT
        \ PRINT "       Do you want to specify a particular major"
        \ INPUT "       within that general area";D$
        \ IF FNFORMATINPUT1$(D$)='Y' THEN 1440%
                ELSE S$=AREA$(D%-1%)+" majors offered."
                \ D$='Y' \ GOSUB 10150% \ GOTO 10200%
                ! Process general academic area specification.

1440    PRINT \ PRINT
        \ PRINT "       Here are the majors that you can specify"
        \ PRINT "       in ";AREA$(D%-1%);":" \ PRINT
        \ PRINT T$;T$;FNFORMATOUTPUT$(J%+1%);". ";
                FNCAPITAL$(MAJOR$(D%-1%,J%))
                        FOR J%=0% TO NUMINAREA%(D%-1%)-1%
        \ PRINT
        \ PRINT "       Please enter the number representing one of these"
        \ INPUT "       specific majors";D1%
        \ IF D1%<1% OR D1%>NUMINAREA%(D%-1%) THEN 1430%
                ELSE BYTE%=BYTE%+D1%
        \ S$=MAJOR$(D%-1%,D1%-1%)+" major offered."
        \ D$='Y' \ GOSUB 10150% \ GOTO 10200%
                ! Process specific major specification.
```

```
1450    D$="kind of sport" \ GOSUB 10450% \ PRINT
        \ PRINT \ PRINT "       Of these two kinds of sports:"
        \ PRINT \ PRINT T$;T$;"1. Intercollegiate"
        \ PRINT T$;T$;"2. Intramural" \ PRINT
        \ PRINT "       Which are you interested in:  ";
        \ INPUT "(Please type its number) ";D%
        \ IF D%<1% OR D%>2% THEN 1220%
                ELSE BYTE%=VAL(D$(D%+1%))
                \ PRINT \ LONG%=1%
        \ PRINT "       Here are the ";D$(D%-1%);" sports which"
        \ PRINT "       you can specify:" \ PRINT
        \ PRINT T$;T$;FNFORMATOUTPUT$(J%+1%);". ";
                FNCAPITAL$(SPORT$(J%))  FOR J%=0% TO 13%
        \ PRINT
        \ PRINT "       Please enter the number of an ";D$(D%-1%)
        \ INPUT "       sport which your college must offer";D1%
        \ IF D1%<1% OR D1%>14% THEN 1450%
                ELSE BYTE%=BYTE%+D1%
        \ S$=FNCAPITAL$(D$(D%-1%))+" "+SPORT$(D1%-1%)+" offered."
        \ D$='Y' \ GOSUB 10150% \ GOTO 10200%
                ! Process sports specifications.  Note no way to specify
                ! "general" sports offerings; no need perceived.


1600    !
        !       DELETE LAST SPECIFICATION
        !

1610    IF TWODELETE%<>0% OR NUMSPECS%=0% THEN PRINT
        \ PRINT "       You cannot delete a specification until"
        \ PRINT "       you have first added another one."
        \ GOTO 20100%
                !   Check for attempt to double delete.

1620    QUAL%(J%)=OLDQUAL%(J%) FOR J%=0% TO OLDK%-1%
        \ K%=OLDK%
        \ NUMSPECS%=NUMSPECS%-1%
        \ PRINT \ PRINT
        \ PRINT T$;T$;"Your last specification:" \ PRINT
        \ PRINT T$;T$;T$;CVT$$(SPEC$(NUMSPECS%),128%) \ PRINT
        \ PRINT T$;T$;"has been deleted." \ PRINT
        \ SPEC$(NUMSPECS%)=''
        \ TWODELETE%=1%
        \ GOTO 10350%
                ! Bring old qualifying array & constants back to life,
                ! print message, & go to print # now qualifying.


1700    !
        !       LIST ACTIVE SPECIFICATIONS.
        !

1710    IF NUMSPECS%=0% THEN PRINT
```

```
        \ PRINT "       No specifications are currently active."
        \ GOTO 20100%
                ! Deal with request to list zero specs.

1720    GOSUB 20250%
        \ PRINT #2%, TAB(28%);"Active Specifications List"
        \ PRINT #2% \ PRINT #2% \ PRINT #2%
        \ FOR J%=0% TO NUMSPECS%-1%
          \ PRINT #2%, T$;"Specification #";FNFORMATOUTPUT$(J%+1%);":";T$;
        \ PRINT CVT$$(SPEC$(J%),128%)
        \ NEXT J%
        \ GOTO 10350%
                ! Print list of active specs, followed by # qualifying.


1800    !
        !       PRINT QUALIFYING COLLEGES.
        !

1810    IF K%=0% THEN PRINT
        \ PRINT "       No colleges qualify - cannot list."
        \ GOTO 20100%
                ! Don't try to list if none qualify.

1820    GOSUB 20250% \ PRINT #2%, TAB(31%);"Qualifying Colleges"
        \ PRINT #2% \ PRINT #2%
        \ PRINT #2%, TAB(14%);"College";TAB(32%);"College";TAB(57%);"College"
        \ PRINT #2%, TAB(14%);"Number";TAB(34%);"Name";TAB(57%);"Address"
        \ PRINT #2%, TAB(14%);"-------";TAB(32%);"-------";TAB(57%);"-------"
        \ PRINT #2%
        \ FOR J%=0% TO K%-1%
                \ PRINT #2%, TAB(14%);LEFT(COLLEGE$(QUAL%(J%)),4%);
                        TAB(26%);MID(COLLEGE$(QUAL%(J%)),5%,20%);
                        TAB(51%);MID(COLLEGE$(QUAL%(J%)),25%,20%)
        \ NEXT J%
        \ GOSUB 20300%
        \ GOTO 20100%
                ! Output to & pause, print header line, qualifying colleges
                ! message if warranted, & back to menu.


1900    !
        !       LIST ALL INFO FOR A COLLEGE.
        !

1910    PRINT \ PRINT
        \ PRINT "       What is the number of the college whose"
        \ INPUT "       information you want";D$
        \ IF CVT$$(D$,2%)='' THEN 20100%
                ELSE L%=VAL(D$)
        \ I%=0%
        \ I%=I%+1% UNTIL CVT$$(LEFT(COLLEGE$(I%),4%),2%)=CVT$$(D$,2%)
                        ! Input college # & find its location in file.
                        ! VAL(D$) is to trap illegal # errors.
```

```
1920    GOSUB 20250%
        \ PRINT #2%, TAB(30%);"Single College Listing"
        \ PRINT #2% \ PRINT #2% \ PRINT #2%
        \ PRINT #2%, "  College Number:"T$;T$;CVT$$(LEFT(COLLEGE$(I%),4%),2%)
        \ PRINT #2%, "  College Name:               ";MID(COLLEGE$(I%),5%,20%)
        \ PRINT #2%, "  City, State:                ";MID(COLLEGE$(I%),25%,20%)
        \ PRINT #2%, "  Zip Code:                   ";MID(COLLEGE$(I%),45%,5%)
        \ PRINT #2%, "  Telephone:                  ";MID(COLLEGE$(I%),50%,13%)
        \ PRINT #2%
        \ PRINT #2%, "  Location Code:              ";MID(COLLEGE$(I%),63%,2%)
        \ PRINT #2%, "  Community Code:             ";MID(COLLEGE$(I%),65%,1%)
        \ PRINT #2%, "  Enrollment Code:            ";MID(COLLEGE$(I%),66%,1%)
        \ PRINT #2%, "  Sex Code:                   ";MID(COLLEGE$(I%),67%,1%)
        \ PRINT #2%, "  Affiliation:                ";MID(COLLEGE$(I%),68%,4%)
        \ PRINT #2%
        \ PRINT #2%, "  Admissions Codes:"
        \ PRINT #2%, "          Selectivity:        ";MID(COLLEGE$(I%),72%,1%)
        \ PRINT #2%, "          Tests:              ";MID(COLLEGE$(I%),73%,3%)
        \ PRINT #2%, "          Fall Deadline:      ";MID(COLLEGE$(I%).76%,5%)
        \ PRINT #2%
        \ PRINT #2%, "  Comprehensive Costs (per year):"
        \ PRINT #2%, "          In-State:       Less than $";
          \ PRINT #2%, CVT$$(NUM$(VAL(MID(COLLEGE$(I%),81%,2%))),2%);",000"
        \ PRINT #2%, "          Out-of-State:   Less than $";
          \ PRINT #2%, CVT$$(NUM$(VAL(MID(COLLEGE$(I%),83%,2%))),2%);",000"
        \ PRINT #2%
        \ PRINT #2%, "  Types of Financial Aid Offered:"
        \ PRINT #2%, "              ";FNCAPITAL$(FINAID$(J%-85%))
                IF MID(COLLEGE$(I%),J%,1%)='Y' FOR J%=85% TO 89%
                        ! Print college characteristics through fin. aid.

1930    PRINT #2%
        \ PRINT #2%, "  Special Programs Offered:"
        \ PRINT #2%, "              ";FNCAPITAL$(SPPROG$(J%-90%))
                IF MID(COLLEGE$(I%),J%,1%)='Y' FOR J%=90% TO 97%
                        ! Print special programs offered.


1940    PRINT #2%
        \ PRINT #2%,"   Major Fields of Study Offered:"
        \ FOR J%=0% TO 11%
                \ IF MID(COLLEGE$(I%),BYTE%(J%),1%)='Y' THEN PRINT #2%
                \ PRINT #2%, T$;FNCAPITAL$(AREA$(J%));":"
                \ PRINT #2%, T$;T$;"  "FNCAPITAL$(MAJOR$(J%,J1%))
                        IF MID(COLLEGE$(I%),BYTE%(J%)+1%+J1%,1%)='Y'
                                FOR J1%=0% TO NUMINAREA%'J%)-1%
1950    NEXT J%
                ! Print majors offered by the college.


1960    PRINT #2%
        \ PRINT #2%, "  Sports Offered:"
        \ FOR J%=0% TO 1%
                \ BYTE%=VAL(D$(J%+2%))
                \ IF MID(COLLEGE$(I%),BYTE%,1%)='Y'     THEN PRINT #2%
                \ PRINT #2%, T$;T$;FNCAPITAL$(D$(J%));":"
                \ PRINT #2%, T$;T$;'  ';FNCAPITAL$(SPORTS$(J1%))
                        IF MID(COLLEGE$(I%),BYTE%+1%+J1%,1%)='Y'
                                FOR J1%=0% TO 13%
1970    NEXT J%
                ! Print sports offered by the college.

1980    PRINT #2% \ PRINT #2% \ PRINT #2%
        \ PRINT #2%, "  This information was accurate through ";
                RIGHT(COLLEGE$(I%),225%);"."
        \ GOSUB 20300%
        \ GOTO 20100%
                ! Print date of last edit, spaces, message, & back to menu.


2000    !
        !       RESTART
        !

2010    GOSUB 10400%
        \ PRINT JUMP$;" Restarting..."
        \ SLEEP 2%
        \ GOTO 20100%
                ! Zero arrays & counters, set switch, & back to menu.


2100    !
        !       DUMP THE FILE FOR DEBUGGING.
        !

2110    PRINT \ PRINT
        \ PRINT "       NUM.OF.COLLEGES%(0%) =";NUM.OF.COLLEGES%(0%)
        \ PRINT \ PRINT
        \ PRINT COLLEGE$(I%);CHR$(10%);CHR$(10%)
                FOR I%=0% TO NUM.OF.COLLEGES%(0%)-1%
        \ SLEEP 6% \ GOTO 20100%
                ! Simple file dump for debugging purposes.


10000   !


        !       P R O G R A M   S U B R O U T I N E S


10100   D$=FNFORMATINPUT2$(D$)
        \ IF D$='' THEN 1220% ELSE RETURN
                ! Format input & check for default to menu.

10150   SPEC$(NUMSPECS%)=S$
        \ NUMSPECS%=NUMSPECS%+1%
        \ OLDQUAL%(J%)=QUAL%(J%)  FOR J%=0% TO K%-1%
        \ OLDK%=K%
        \ RETURN
                ! Store last specification, shift last qualifying set to
                ! OLDQUAL%() to prepare for new one in QUAL%().


10200   K%=0%
        \ FOR J%=0% TO OLDK%-1%
                \ IF MID(COLLEGE$(OLDQUAL%(J%)),BYTE%,LONG%)=D$
                        THEN QUAL%(K%)=OLDQUAL%(J%)
                        \ K%=K%+1%
10210   NEXT J%
        \ GOTO 10350%
                ! Check for qualifying (=) colleges & build QUAL%() array
                ! with those that do.  Used for most characteristics.


10250   K%=0%
        \ FOR J%=0% TO OLDK%-1%
                \ IF VAL(MID(COLLEGE$(OLDQUAL%(J%)),BYTE%,LONG%)) <= D%
                        THEN QUAL%(K%)=OLDQUAL%(J%)
                        \ K%=K%+1%
10260   NEXT J%
        \ GOTO 10350%
                ! Check for qualifying (<=) colleges & build QUAL%() array
                ! with those that do.  Used for costs.


10300   K%=0%
        \ FOR J%=0% TO OLDK%-1%
                \ D$=MID(COLLEGE$(OLDQUAL%(J%)),BYTE%,LONG%)
                \ D1%=INSTR(1%,D$,"/")
                \ IF D1%=0% THEN IF CVT$$(D$,2%)='NONE' THEN 10310%
                  ELSE 10320%
                  ELSE D1%=(VAL(LEFT(D$,D1%-1%)))*100% + VAL(RIGHT(D$,D1%+1%))
                  \ IF D1%>=D% THEN 10310% ELSE 10320%
10310   QUAL%(K%)=OLDQUAL%(J%)
        \ K%=K%+1%
10320   NEXT J%
                ! Check for qualifying (>=) colleges & build QUAL%() array
                ! with those that do.  Used for application deadline.


10350   PRINT \ PRINT
        \ PRINT T$;FNFORMATOUTPUT$(K%);" college(s) qualify."
        \ PRINT \ PRINT
        \ SLEEP 2% \ GOTO 20100%
                ! Tell how many colleges qualify & return to menu.


10400   OLDK%, NUMSPECS%=0%
        \ K%=NUM.OF.COLLEGES%(0%)
        \ MAT OLDQUAL%=ZER
        \ SPEC$(J%)='' FOR J%=0% TO 24%
        \ QUAL%(J%)=J%  FOR J%=0% TO NUM.OF.COLLEGES%(0%)-1%
        \ INIT%=1%
        \ RETURN
```

```
                ! Zero qualifying array, spec's array, and counters;
                ! initialize temp. qualifying array with whole college file.

10450   PRINT
        \ PRINT "       I assume that you want to specify that your college"
        \ PRINT "       must offer a particular ";D$;"."
        \ PRINT "       (You can specify more than one by running this"
        \ PRINT "       option more than once.) ";
        \ RETURN
                ! Introduction routine for specifying financial aids,
                ! special programs, majors, & sports.


19000   !

        !       E R R O R - H A N D L I N G


19010   ON ERROR GOTO 19000%
                ! Reset error trap.

19020   IF ERR=52% AND (ERL=1920% OR ERL=10250% OR ERL=10300%) THEN PRINT
        \ PRINT "       There seems to be an illegal number in the college"
        \ PRINT "       file.  Please try again or have your counselor check"
        \ PRINT "       costs/deadline data for the college in file position"
        \ PRINT "       number ";FNFORMATOUTPUT$(I%);"."
        \ PRINT \ SLEEP 4%
        \ RESUME 20100%
                ! If comparison turns up illegal numbers in COLLEG.FIL.

19030   IF ERR=52% THEN PRINT
        \ PRINT BOGUS$ \ PRINT
        \ IF ERL=1380% THEN RESUME 1370%
                ELSE IF ERL=1390% THEN RESUME 1390%
                ELSE IF ERL=1400% THEN RESUME 1400%
                ELSE IF ERL=1910% THEN RESUME 1910%
                ELSE RESUME 20100%
                ! Process other illegal number errors.

19040   IF ERR=50% THEN PRINT BOGUS$ \ RESUME
                ! Data format or illegal # error.

19050   IF ERR=55% AND ERL=1910% THEN GOSUB 20200% \ RESUME 20100%
                ! Bogus college number:  send message & back to menu.

19060   IF ERR=28% THEN RESUME 32710%
                ! Trap ^C and exit.

19070   IF ERR=8% THEN PRINT
        \ PRINT "       That device is not available right now."
        \ PRINT \ RESUME 20250%
                ! Device not available error.
```

```
19080   IF ERR=5% THEN PRINT JUMP$
        \ PRINT "       The college file either hasn't been constructed yet"
        \ PRINT "       or it isn't available right now.  Please ask your"
        \ PRINT "       counselor about this before going any further."
        \ SLEEP 3%
        \ RESUME 32700%
                ! If Can't Find File error, then exit.

19090   PRINT \ PRINT
        \ PRINT "       Please tell the computer staff that there is an"
        \ PRINT "       Error Number";ERR;"at Line Number";ERL;"."
        \ SLEEP 2% \ PRINT \ PRINT
        \ RESUME 20100%
                ! Print number & location of error, return to menu.

20000   !

        !       S T A N D A R D   S U B R O U T I N E S


20100   PRINT \ PRINT \ PRINT
        \ INPUT "       Main Option:  (Hit 'RETURN' to get list) ";D$
        \ D$=FNFORMATINPUT2$(D$)
        \ GOTO 1130%
                ! Snort-hand for full menu.


20150   D$=FNFORMATINPUT3$(D$)
        \ IF LEN(D$)>=L% THEN D$=LEFT(D$,L%) ELSE D$=D$+SPACE$(L%-LEN(D$))
20160   RETURN
                ! Formats input, cuts it off or adds following
                ! spaces as necessary--(used for words).


20200   PRINT JUMP$
        \ PRINT "       I cannot find the college number that you"
        \ PRINT "       specified listed in the file anywhere.  Please"
        \ PRINT "       refer to a list of the colleges and their"
        \ PRINT "       numbers, and try again."
        \ PRINT JUMP$ \ SLEEP 4% \ RETURN
                ! Message for bogus college number.


20250   PRINT
        \ INPUT "       Output to:  ('RETURN' = this terminal) ";KB$
        \ IF CVT$$(KB$,2%)='' THEN KB$="KB:"
                ! Allow alternate printer or file to receive finished list.
20260   OPEN KB$ AS FILE 2%
        \ PRINT
        \ INPUT "       Pause";D$
        \ PRINT #2%, JUMP$
        \ PRINT #2%, TAB(25%);"CHOOSE College Selection Program"
        \ PRINT #2% \ PRINT #2%
        \ RETURN
                ! Output to, pause for paper, & print header.
```

```
20300   DEF FNCAPITAL$(D$)=CVT$$(LEFT(D$,1%),32%)+RIGHT(D$,2%)
                ! Capitalizes first letter in phrase.

20310   RETURN
                ! Print space after listing, & if different KB,
                ! send completion message.

27000   !

        !       S T A N D A R D   F U N C T I O N S

27100   DEF FNFORMATINPUT1$(D$)=LEFT(CVT$$(D$,34%),1%)
                ! Kill any input spaces, capitalize,
                ! and return leftmost character.

27150   DEF FNFORMATINPUT2$(D$)=CVT$$(D$,34%)
                ! Kill input spaces & capitalize.

27200   DEF FNFORMATINPUT3$(D$)=CVT$$(D$,188%)
                ! Discard excess characters & capitalize.

27250   DEF FNFORMATOUTPUT$(D%)=CVT$$(NUM$(D%),2%)
                ! Strips spaces usually printed with a number.

32700   !

        !       P R O G R A M   C O M P L E T I O N

32710   CLOSE I% FOR I%=1% TO 12%
        \ PRINT JUMP$;"         Glad to be of service.";JUMP$
        \ NO EXTEND
                ! Close all I/O channels, print closing, & end extend.

32767   END
```